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SINGER
INSTRUMENTATION

OPERATOR'S HANDBOOK

for

CP-7

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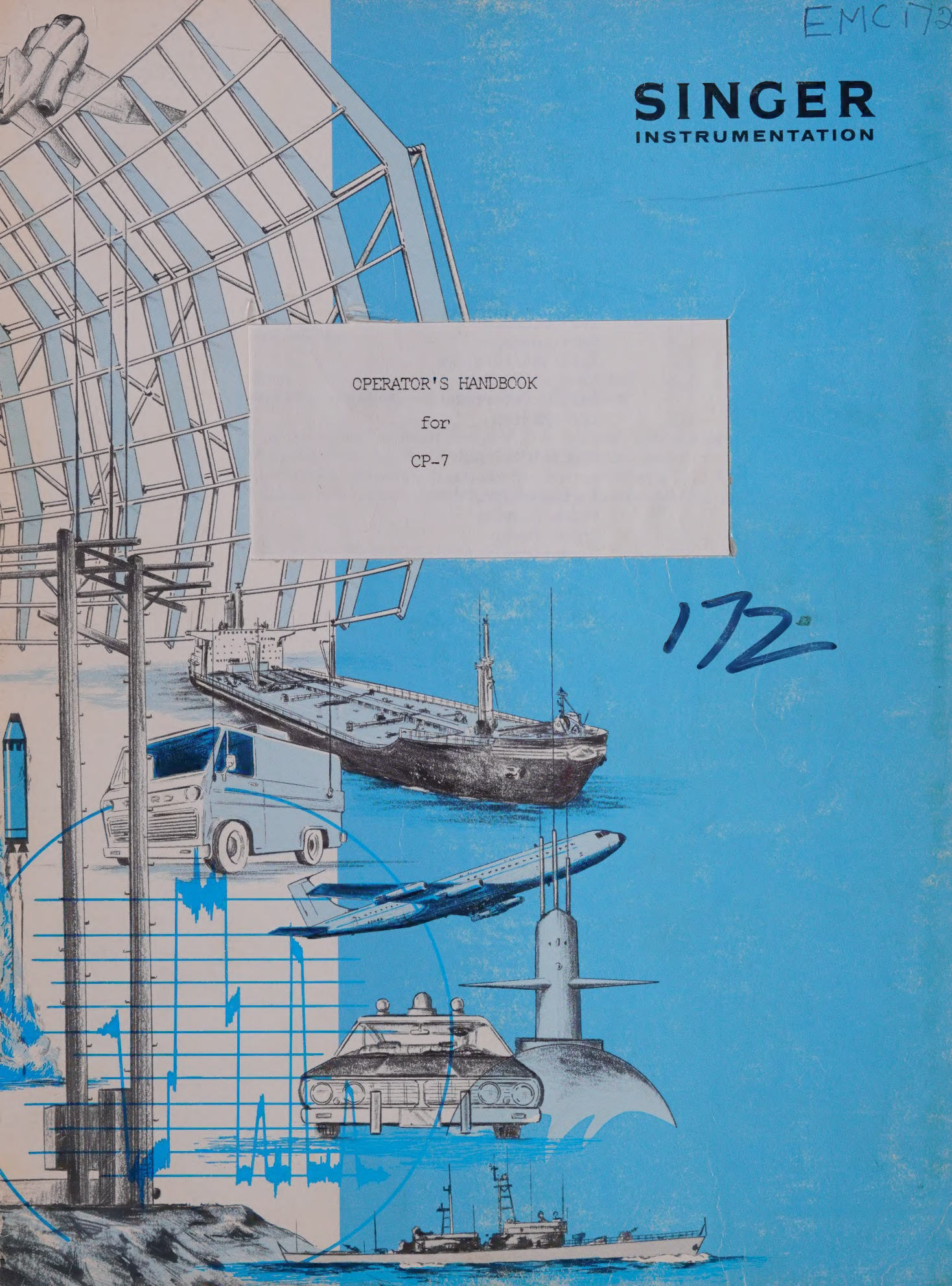

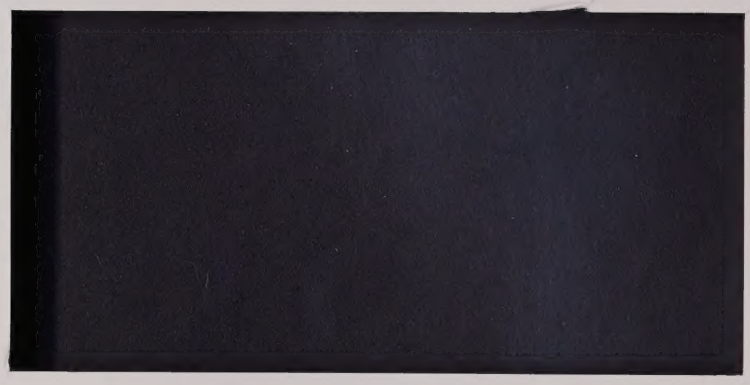

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		1	Addition of Schematics	12-9	[illegible] (lg)

OPERATOR'S HANDBOOK

for

CP-7

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MATERIAL	APPD	SIZE A / CODE IDENT NO. 36090 / DWG NO. L191 000 650	
		SCALE	SHEET 1 OF 40

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Chargeable repairs: If requested, an estimate of charges will be made prior to repairs. Please provide us with the following information in order to expedite the processing of your instrument:

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2. Serial Number
3. Description of trouble(1)
4. Approximate date instrument was placed in operation.
5. Approximate number of hours in use.
6. Has maintenance action been previously requested.
7. Other comments.

(1) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken and any other relevant data.

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REVISION STATUS OF SHEETS

SHEET NO.	REVISION	SHEET NO.	REVISION
	Ø revisions as of 12/5/77		
38	1 -- Addition of Schematics to top assembly drawings/Section VIII. (12/9/77)		
10	1 Items 20,21,22 of Table 3.1 deleted. (12/9/77)		

REV LTR	SIZE	CODE IDENT NO.	DWG NO.
	A	36090	L 191 000 650
	SCALE		SHEET 2 of 40

I. SYSTEM DESCRIPTION

1.0 Introduction. The CP7 is a controller designed to operate Singer Instrumentation Series 7 receivers. Its input interface is an IEEE 488/1975 general purpose instrumentation bus. Thus, the CP7 can be used with a large number of desk top calculators, smart terminals, and small digital computers to obtain digital RF interference data.

1.1 Range of Control. The CP7 is designed to control Singer Instrumentation receivers covering the frequency range of 20 Hz to 18 GHz. These receivers are the NM7, NM17/27, NM37/57, and NM67. When these receivers are connected into the CP7 control system and operated in the local control mode, the operator has all of the normal front panel control functions available for his use. By switching the receivers into the remote mode, the CP7 takes over all of the front panel control functions.

1.2 Control Functions. The CP7, operated in a local mode, has all of the normal control functions available from the receiver. That is, one can tune the receivers, set bandwidths and attenuators, etc. In addition to these normal receiver functions, a series of special control functions is available. Utilizing the CP7, receivers can be set to sweep from any start frequency to any stop frequency, within the range of the receiving system. The CP7 automatically selects the proper receiver and band to accomplish the frequency sweep programmed by the operator.

1.3 X-Y Recorder. The CP7 contains digital to analog converter outputs which can be used to drive an analog X-Y recorder. This analog recording system can be used as a primary recordeing system for interference data being produced by the Series 7 Measurement System. The format of this recording system can be the normal 1, 4, 8, 16, 24 band plots which are in general use by the RFI industry. It also has the capability to automatically scale the specified sweep frequency in either a linear or semi-log plot of amplitude versus frequency. Internally programmed correction factors can be provided which allow this plot to use final engineering units.

1.4 Oscilloscope. A separate digital to analog converter provides a scaled X-axis drive voltage for an oscilloscope monitor. The Y-axis of the receivers would be connected directly to the log video output signal. In using the oscilloscope output, sweep rates of 30 times per second can be obtained. This sweeping capability provides the user with a spectrum analyzer type display.

1.5 IEEE 488/1975 Bus. The CP7 is designed to connect into the IEEE 488/1975 instrument bus. Singer Instrumentation provides a complete operating system based on the use of a H-P 9815 desk top calculator. This implementation was chosen because of its extreme simplicity and low cost. Singer Instrumentation will provide all of the operational software necessary to implement automatic data gathering in compliance with MIL-STD-461/462 test requirements. A complete programming instruction manual for the CP7 using the H-P 9815 claculator will be supplied. Utilizing this manual, individual system users can easily program the receiving system to perform any special measurement requirements. All of the normal accessories supplied by Hewlett-Packard in support of the 9815 system can be integrated into this operating system at the user's discretion.

1.6 16-bit I/O Port. The CP7 computer interface unit provides a two-way communication path for data and control signals between the central processor and the EMI meter. This interface unit in the CP7 is a 16-bit I/O Port, with TTL comparable logic levels, timing, and control definition given in the operating instruction.

1.7 RS232C Interface. The CP7 has an RS232C interface, used for terminal communication. Data character format and data transmission format are in the operation instruction section of this manual.

1.8 Information. Further technical information can be obtained by contacting Jerry Rothhammer at Singer Instrumentation, 5340 Alla Road, Los Angeles, California, 90066, (213) 870-5461.

II. SPECIFICATIONS

2.0 Intoduction. This section contains information for the Model CP7 Microprocessor Controlled Programmer.

2.1 Video Display.

2.1.1 Resolution: ± 5.0 V, 12-bit binary A/D.

2.2 Input Power.

115 V RMS, 47 Hz to 420 Hz, approximately 105 watts.
230 V RMS, 47 Hz to 420 Hz, approximately 105 watts.

2.3 Dimensions.

Height: 8-3/4 inches.
Width: 16-3/4 inches.
Depth: 18-1/2 inches.
Weight: 49 pounds.

2.4 Input/Output Control Signals.

2.4.1 Receiver Control Signals: All control signals necessary to run the NM7, NM17/27, NM37/57, and the NM67 are provided by the CP7.

2.4.2 Plotter Control Signals:

a. Voltage Range: 0 V to 5 V nominal (X voltage).
b. Resolution: 12-bit binary.
c. Current Range: ± 20 milliamperes (limited).
d. Output Impedance: Zo = 1000 ohm maximum.
e. Pen Control: Relay closure.

2.4.3 CRT Control Signals:

a. Voltage Range: 0 V to 5 V nominal (X voltage).
b. Resolution: 12-bit binary.
c. Current Range: ± 20 milliamperes.
d. Blanking: Relay closure.
e. Voltage range.

2.4.4 Remote Attenuator Control Signals: All control signals required to run the CIU7 are provided.

a.	Voltage:	0 V to +30 V.
b.	Current:	40.0 milliamperes.
c.	Logic:	"True" = 0 volts.

2.4.5 Remote Interfaces. (IEEE Standard No. 488/1975.) Three remote interfaces are provided to control the CP7 from an external computer or calculator. These interfaces are:

a. IEEE Standard 488/1975.
b. RS232C
c. 8-bit parallel I/O.

III. INSTALLATION

3.0 Preparation for Use.

3.0.1 Bench Operation. The Model CP7 Programmer is shipped ready for use as a bench-operated instrument. A folding down keyboard must be open for Local Operations. A pull-down tilt support is attached to the feet under the front for elevating the instrument if desired.

3.0.2 Rack Mounting. A set of adapter brackets and attaching screws are provided to mount the unit in a standard 19-inch rack. Remove the four feet and folding support from bottom of instrument.

3.0.3 AC Power Requirements. The Model CP7 is supplied with a 2ASB fuse for 115 V operation unless otherwise requested by a customer. For 230 V operation, set the circuit board switch to the 230 V side with a 1ASB fuse.

3.1 Rear Panel. (See Figure 3.1)

3.1.1 Introduction. Functional descriptions of the rear panel are in Table 3.1.

3.1.2 System Cabling. The typical system for the CP7 is given in Figure 3.2.

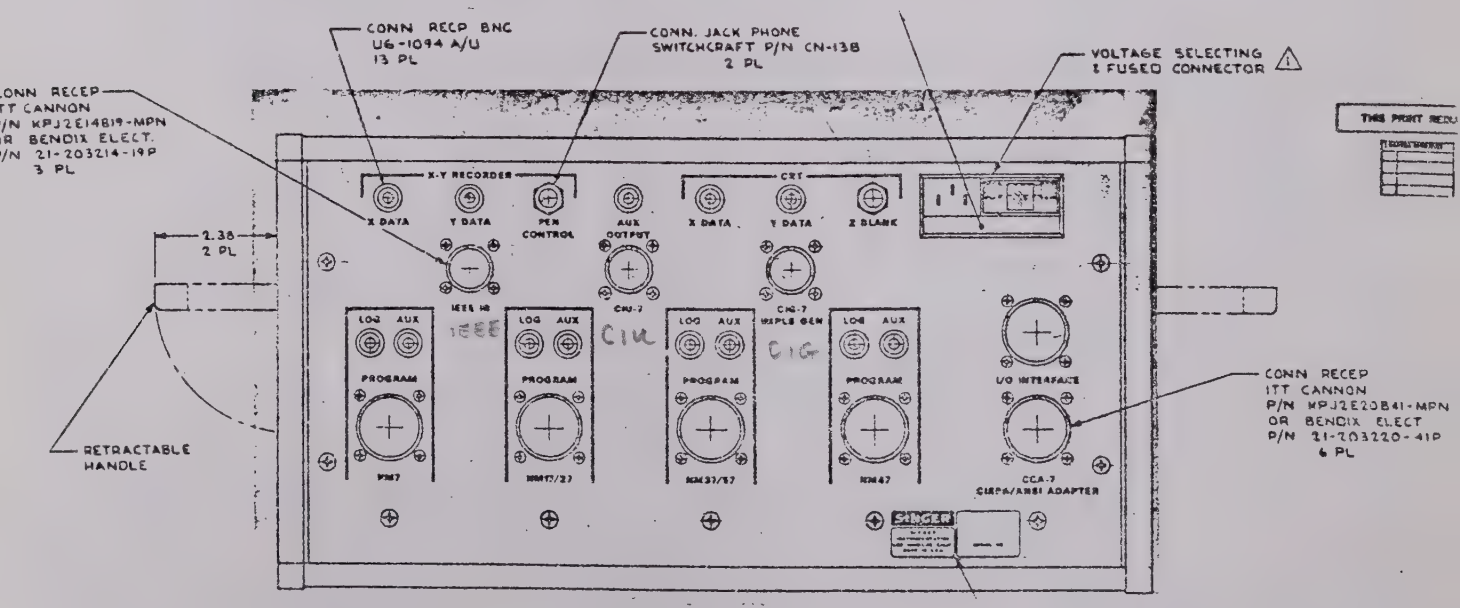
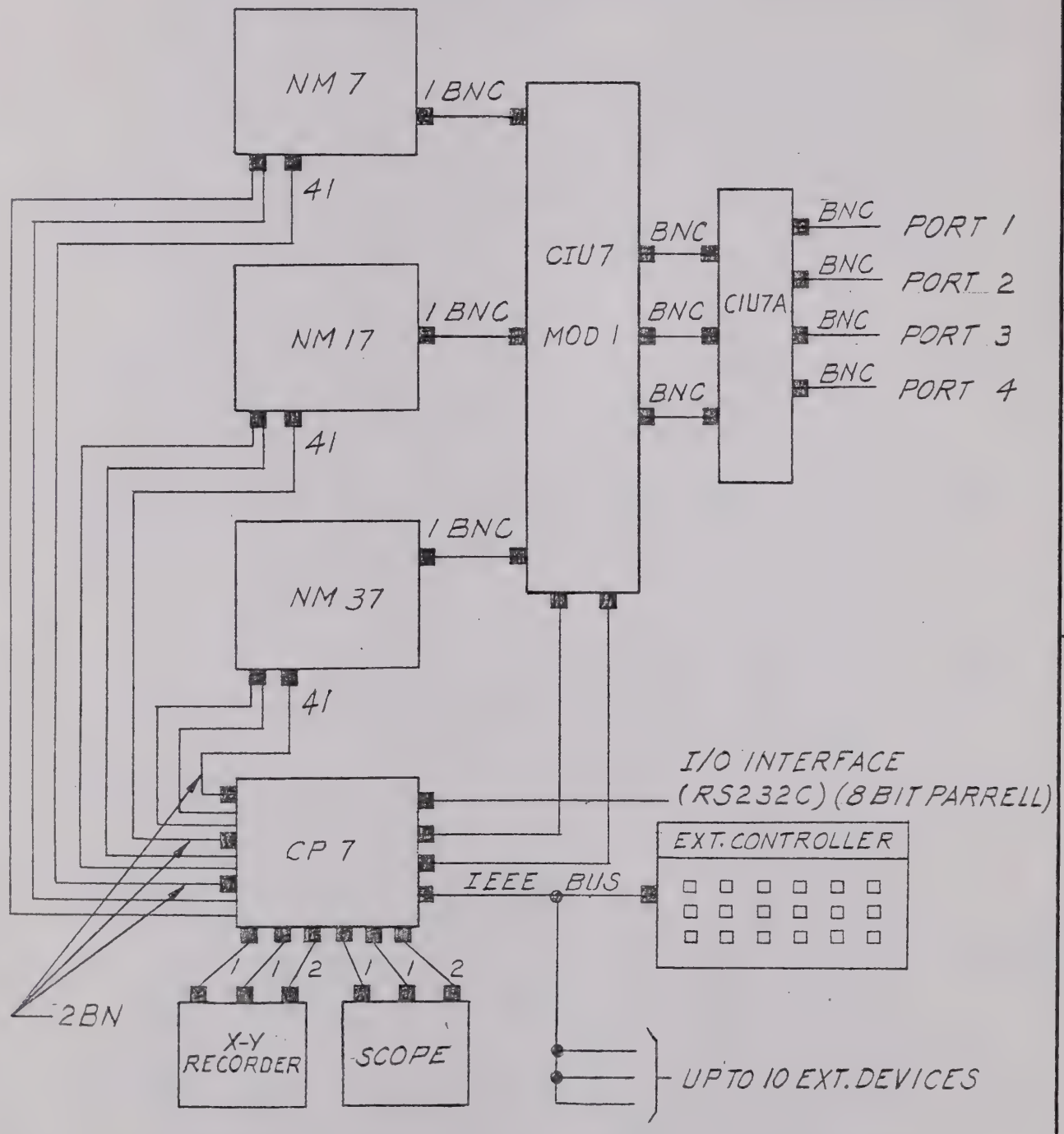


Figure 3.1



MODEL SI-700A SYSTEM CABLING

SINGER LIBRASCOPE DIVISION	INSTRUMENT INTERCONNECTION B/D		
DRAWN AMS SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. FIGURE 3.2
ISSUED SEE PAGE 1	SCALE		SHEET 8 of 40

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TABLE 3.1

CONTROLS, INDICATORS, RECEPTACLES

REAR PANEL (CP7)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
1	NM-7 LOG	BNC receptacle (J12)	Log video input from the model NM-7 for CRT Display.
2	PROGRAM	41-pin receptacle (J21)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
3	AUX	BNC receptacle (J13)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-7 is selected by model CP7.
4	NM-17/27 LOG	BNC receptacle (J14)	Log video input from the model NM-17/27 for CRT Display.
5	PROGRAM	41-pin receptacle (J22)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
6	AUX	BNC receptacle (J15)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-17/27 is selected by model CP7.
7	NM-37/57 LOG	BNC receptacle (J16)	Log video input from the model NM-37/57 for CRT display.
8	PROGRAM	41-pin receptacle (J23)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
9	AUX	BNC receptacle (J17)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-37/57 is selected by model CP7.
10	NM-67 LOG	BNC receptacle (J18)	Log video input from the model NM-67 for CRT Display.

TABLE 3.1 (Cont'd)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
	NM-67 (Cont'd)		
11	PROGRAM	41-pin receptacle (J24)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
12	AUX	BNC receptacle (J 19)	Any input to this jack appears at AUX OUTPUT jack (item 19) when model NM-67 is selected by model CP7.
	X-Y RECORDER		
13	X DATA	BNC receptacle (J 1)	Provides data to the X-axis of an X-Y recorder.
14	Y DATA	BNC receptacle (J 2)	Provides data to the Y-axis of an X-Y recorder.
15	PEN CONTROL	Microphone jack receptacle (J3)	Provides a contact closure to drop the pen of an X-Y recorder.
	CRT		
16	Y DATA	BNC receptacle (J.6)	Provides data to the Y-axis of an oscilloscope.
17	X DATA	BNC receptacle (J 5)	Provides data to the X-axis of an oscilloscope.
18	Z BLANK	Microphone jack (J 7)	Provides both a contact closure and a contact opening for eliminating the retrace line for storage oscilloscope X-Y recording.
19	AUX OUTPUT	BNC receptacle (J31)	Provides output for any input to AUX receptacles, items 3, 6, 9, and 12 when appropriate receiver is selected by Band Select switches.
20	DELETED		
21	DELETED		
22	DELETED		
23	POWER	3-pin receptacle (J 8.)	Ac power input receptacle.

TABLE 3.1 (Cont'd)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
24	CIU7	19-pin receptacle (J10)	Provides means of connecting the remote attenuator and receiver switching unit (CIU7) to the CP7.
25	CIG7 IMPLS.GEN.	19-pin receptacle (J11)	Provides means of connecting the CIU7 to the CP7 when the CIG7 operation is included in the CIU7.
26	IEEE IB	19-pin receptacle (J 9)	Provides the I/O signals for the IEEE 488/1975 Bus.
27	I/O INTERFACE	41-pin receptacle (J20)	Provides the I/O signals for the RS232C Interface and the 8-bit parallel interface.
28	CISPR/ANSI ADAPTER	41-pin receptacle (J23)	Provides a means of connecting the CCA7 (CISPR/ANSI ADAPTER) to the CP7.
29	AUX OUT	BNC receptacle (J4)	Provides auxilliary data from selected receivers.

IV. OPERATING INSTRUCTIONS

4.0 Local Operations.

4.0.1 Introduction. This section deals with the functional description of controls and receptacles, operating instruction, and calibration procedures for recording equipment.

4.0.2 Front Panel. The CP7's front panel consists of: Power Switch, Keyboard, and LED Display. The Power Switch is used to turn on the power to the CP7; the Keyboard (Figure 4.2, Table 4.1) is used to control the CP7 functions; and the LED Display is used to display the CP7's status and error messages.

Figure 4.1

4.0.3 Keyboard. The keyboard (Figure 4.2) consists of two groups of keys. The first group is a numerical keyboard containing numerals 0 through 9, a decimel point, four (4) unit keys, and a "clear entry" key. See Table 4.1 for uses of command keys.

The command to the CP7 consists of two classes. The first class is Set-up Commands, and the second class is Operation Commands. The Set-up Commands specify the CP7's parameters; i.e., Bandwidth, Detector Function, etc. The Operation Commands instruct the CP7 to perform a function such as setting the Receiver System to a specific frequency.

For keyboard code, see Table 4.2.

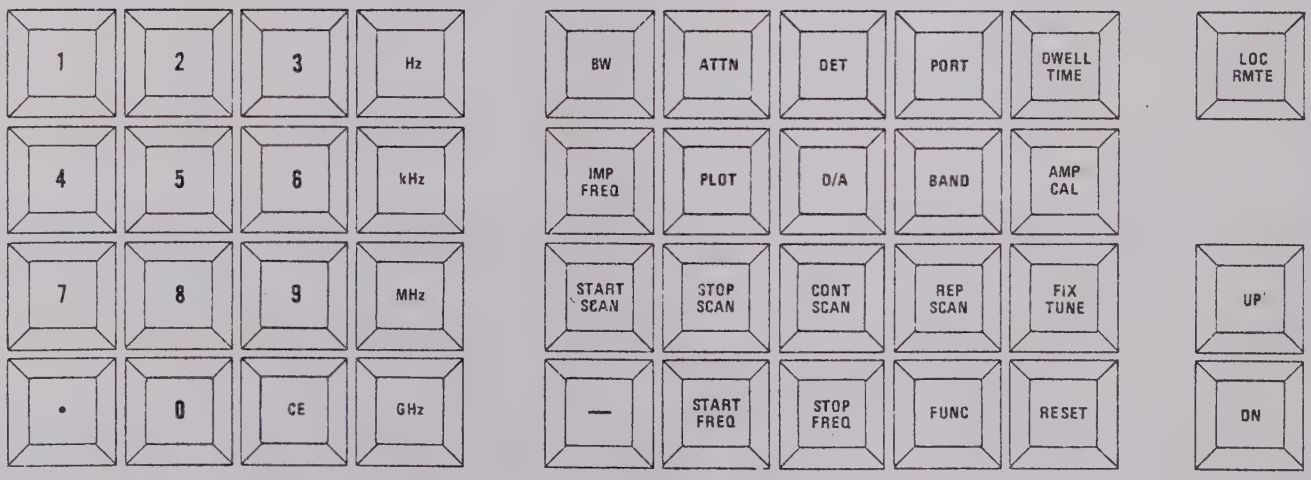


Figure 4.2

TABLE 4.1

KEYBOARD

KEY	BOARD COMMAND	RMTE COM.	FUNCTION	EXAMPLE
SET	UP COMMANDS			
LOC RMTE			This push push switch determines whether operation is controlled by the CP7 or by the remote digital controller.	
BW	i BW	iA	Controls the calibrated bandwidth of receiver being swept.	Set system to bandwidth i, where i = 1 to 4
DET	i DET	iB	Controls the Detection mode in the receiver. CAL -- Disconnects the RF input and energizes on impulse generator for AMP. CAL. FI -- Select the field intensity. QP -- Select the Quasi-Peak PEAK-- Select the Peak signal value with holding time set by DWELL TIME -- maximum of 3.0 seconds	Set system detector to i where i = 1 for CAL = 2 for FI = 3 for QP = 4 for PEAK
ATTN	i ATTN	iD	Controls the gain amp. in the receivers and controls the remote attenuator assembly. In AUTO mode, the attenuators are controlled by the CP7 to obtain scale readings.	Set system attenuator to i, where i = 0, 20, 40, 60, ~~80~~, ~~100~~, -20,-40. 1 = AUTO
PORT	i PORT	iC	Select antenna port in a remote unit.	Select antenna port i, where i = 1 to 5 for Ports 1 to 5 i = 6 for Auto RE Port Select i = 7 for Auto CE Port Select 5=1.8.6 ant
DWELL TIME	i DWELL TIME	iQ	Select the Peak Detector Hold time.	Set Dwell Time to i, where i = 1 to 255 10mS Step 0 255×i
IMP FREQ	i IMP FREQ	iF	Set up calibration. Impulse repetition rate in remote calibrator. i = 0-11 each increment ½ of 0 = 8MHz	Set Imp. Freq. to i, where i = ( ) Hz. Set calibration Imp. Repetition rate to i, where i = 0 to 15 Repitition Rate: = $\frac{32\ \text{MHz}}{2i}$ 32MHz — 2i 30 ≈ 1MHz

TABLE 4.1 (Cont'd)

KEY	KBOARD COMMAND	RMTE COMM.	FUNCTION	EXAMPLE
OPERATION COMMANDS				
START SCAN	START SCAN	V	This key initiates a single scan of the receivers from the starting frequency to the selected stop frequency. If the plotter is enabled, a multiband plot of the receiver data will be displayed. If this command is initiated from a remote controller device, the data from the receivers is transmitted back to the remote device. The The sweep increment is one-half BW. A "999.00" followed by the starting frequency of the band, is output at the start of each band and a "999.99" is output at the end of the scan.	
STOP SCAN	STOP SCAN	X	This key is used to stop a scan that is in progress. When the key is depressed, the scan is stopped and the frequency and amplitude at each point is displayed on the LED display.	
CONTINUE SCAN	CONT SCAN	Y	This key is used to resume a scan that was interrupted. NOTE: The continue key will always resume scan at the place it was stopped, with the same conditions at which the scan was stopped.	
REPETITIVE SCAN	REP SCAN	W	This key is used to select the CRT mode of operation. It causes the CP7 to do a repetitive scan from the selected start and stop freq.s.	
FIX TUNE	FIX TUNE	iU	This key sets the receivers to "i" frequency and displays the frequency and output of the detector readings on the LED display. In the remote mode, the readings are sent to the external controller device. NOTE: If only the key is struck, another reading is taken at the same frequency.	

Table 4.1, SetUp Commands Continued

KEY	KBOARD COMMAND	RMTE COMM.	FUNCTION	EXAMPLE
PLOT	i PLOT	i N	Set up plotter function. Plot on 1,4,8,16,24	Set plotter mode to i, where i = 0 to 3 0 for Plotter Off ~~1 for Plotter on~~ 2 for Plotter Min. Cal. 3 for Plotter Max. Cal.
D/A	i D/A FIX TUNE	iLU	Lets you select any frequency in any band. used with fix tune. NOTE: This key is used in conjunction with the band key to tune receivers to an overlapping band condition.	Tune NM17/27 to 12 KHz i BAND FIX TUNE where i = 2 for Band 2. i D/A FIX TUNE where i = 12KHz
BAND	i BAND	iJU	This key is used in conjunction with D/A key.	See D/A.
AMP CAL	i AMP CAL	I	Used to calibrate the receivers. When this switch is depressed, the CP7 automatically calibrates each receiver in the system. The numbers of the receivers that have calibrated properly are displayed on the LED display.	
START FREQ	START FREQ	iO	This key enters the starting sweep frequency for the single scan or repetitive scan operation.	Set start frequency to i, where i = some value between 20 Hz to 18 GHz. can use E limit
STOP FREQ	STOP FREQ	iP	This key enters the stop sweep frequency for the single scan or repetitive scan operation.	Set stop frequency to i, where i = some value between 20 Hz and 18 GHz.
FUNC	FUNC	iR	This key is used to set up the CISPR/ANSI ADAPTER(CCA7)	FUNC = disable i = 0 for log/log CISPR enable i = 1 for linear/linear CISPR enable i = 2-6 for Select frequency i = 7-14 for Attenuator
RESET	RESET	Z	This key is used to reset the CP7 to its initial conditions.	
UP or DOWN	UP DOWN		These keys are used to manually tune the receivers.The time rate is adjustable by setting DWELL TIME.	Reports every 10 increments (use Dwell 0 for fastest results)

TABLE 4.2

KEYBOARD CODE

	Binary Number	
0	0	(0)
1	1	(1)
2	2	(2)
3	3	(3)
4	4	(4)
5	5	(5)
6	6	(6)
7	7	(7)
8	8	(8)
9	9	(9)
.	10	.
Hz	A	Hz
Kz	B	Kz
MHz	C	MHz
GHz	D	GHz
CE	E	CE
CW	F	CW
DET	10	DET
PORT	11	PORT
ATT	12	ATT
(-) GAIN	13	(-) GAIN
IMP FREQ	14	IMP FREQ
AMP CAL	15	AMP CAL
BAND	16	BAND
D to A	17	D to A
PLOT	18	PLOT
START FREQ	19	START FREQ
STOP FREQ	1A	STOP FREQ
DWELL TIME	1B	DWELL TIME
FIXED TUNE	1C	FIXED TUNE
START SCAN	1D	START SCAN
CONTINUOUS SCAN	1E	CONTINUOUS SCAN
STOP SWEEP	1F	STOP SWEEP
CONTINUE SWEEP	20	CONTINUE SWEEP

4.1 Remote Operations. All Remote Commands to the CP7 are in the form of an ASCII character string. Each command and its function is given in Table 4.1. The CP7 has three remote I/O interfaces. These are: 1) IEEE 488/1975 Interfaces; RS232C Interface ports; and an 8-bit parallel I/O port.

4.1.1 IEEE 488/1975 Interface signals are on J9. An adapter cable is used to provide the system connector interface. (See Figure 4.3) The following functions are implemented:

a. Source Handshake
b. Acceptor Handshake
c. Talker function
d. Listener function
e. Device clear function

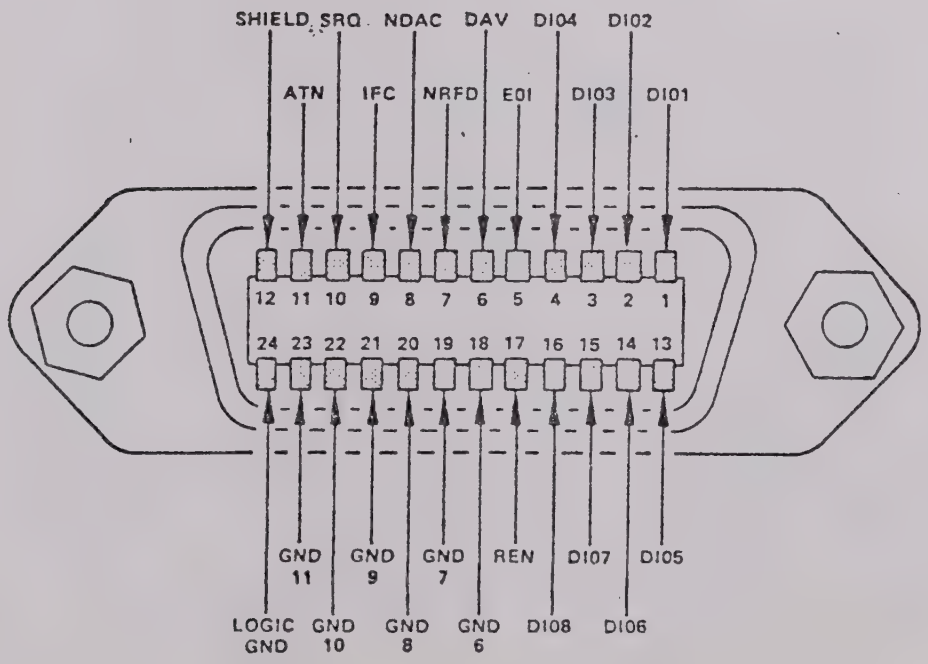


Figure 4.3

4.1.1.1 Bus Cabling. In order to ensure proper operation of the bus, two rules must be observed regarding the total length of the bus cables when they are connected together:

a. The total length of the cable permitted in one bus system must be less than or equal to two meters times the number of devices connected together;

b. The total length of cable must not exceed 20 meters.

4.1.1.2 Bus Signal Lines. The bus consists of sixteen signal lines that are defined as follows:

1. D101 Data Input/Output 1
   ⋮
8. D108 Data Input/Output 8
9. DAV Data Valid
10. NRFD Not Read for Data
11. NDAC Data Not Accepted
12. IFC Interface Clear
13. ATN Attention
14. SRQ Service Request
15. REN Remote Enable
16. EOI End or Identify

4.1.1.3 Logic Levels. All signals use negative-true logic: high more than 2.4 V; low less than 0.4 V. The bus structure is organized into three sets of signal lines:

a. Data Bus -- 8 lines;

b. Handshake or Control -- 3 lines;

c. Interface Management -- 5 lines.

4.1.2 RS232C Interface signals are on J .

4.1.3 CP7 16-bit I/O Port Interface signals are on J . The CP7 16-bit I/O port provides the capability of interfacing the CP7 through a 16-bit interface. The interface consists of:

16 input data lines	IDO-ID15
16 output data lines	OD6-OD15
1 output strobe line	IS-
1 output strobe link	OS-
CP7 ready line	RDY-

(4.1.3.1 Cont'd)

All interface lines are TTL. Comparable logic 0 = .2V ± .2 volts. Logic 1 = 3.0V ± .4 volts. See Table 4.3 for pin configuration.

4.1.3.2 Input Timing. The input data lines are used to transmit data from the control device to the CP7. The RDY- line in a Logic 1 state indicates the CP7 is ready to accept data. The IS- line is used to strobe the data on the input lines into the CP7. See Figure 4.4.

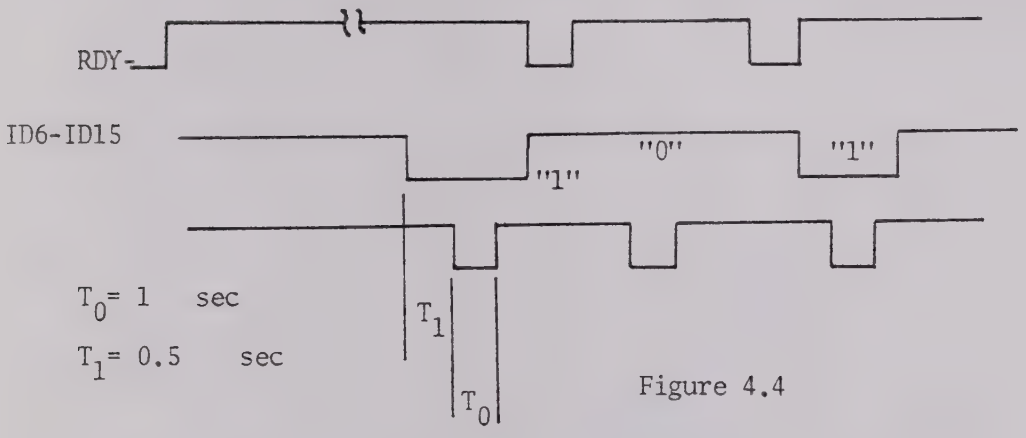


Figure 4.4

4.1.3.3 Output Timing. The output data lines are used to transmit data from the CP7 to the control device.
See Figure 4.5

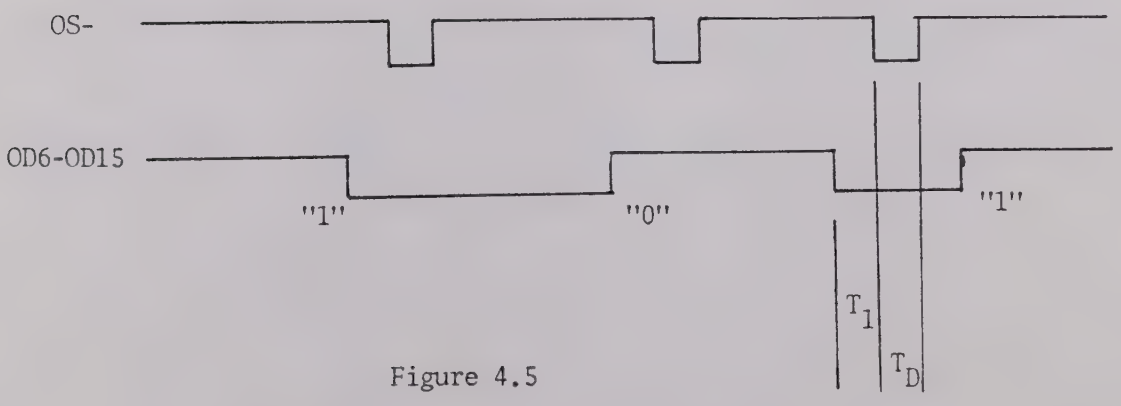


Figure 4.5

4.1.3.4 Data Format. All I/O data is 7-bit ASKII coded.

TABLE 4.3

PIN CONFIGURATION

RS232C		8-BIT I/O	
Connector Pin	Function	Connector Pin	Function
J20A	TX	J20G	CA1
J20B	RX	J20H	OUT 1
J20C	COM	J20J	OUT 2
J20D	COM	J20K	OUT 3
J20E	COM	J20L	OUT 4
J20F	PTC	J20M	OUT 5
		J20N	OUT 6
		J20P	OUT 7
		J20R	OUT 8
		J20a	READY
		J20b	IN 1
		J20c	IN 2
		J20d	IN 3
		J20e	IN 4
		J20f	IN 5
		J20g	IN 6
		J20h	IN 7
		J20i	IN 8
		J20t	ENTER
		J6 J16	SCOPE (Y)
		J	COM
		J4 J19	AUX OUT
		J	COM

V. THEORY OF OPERATION

5.0 Introduction. This section of the manual contains the theory of operation of the Model CP7 Programmer. The information is related to the simplified block diagram contained in the section. See Figure 5.1.

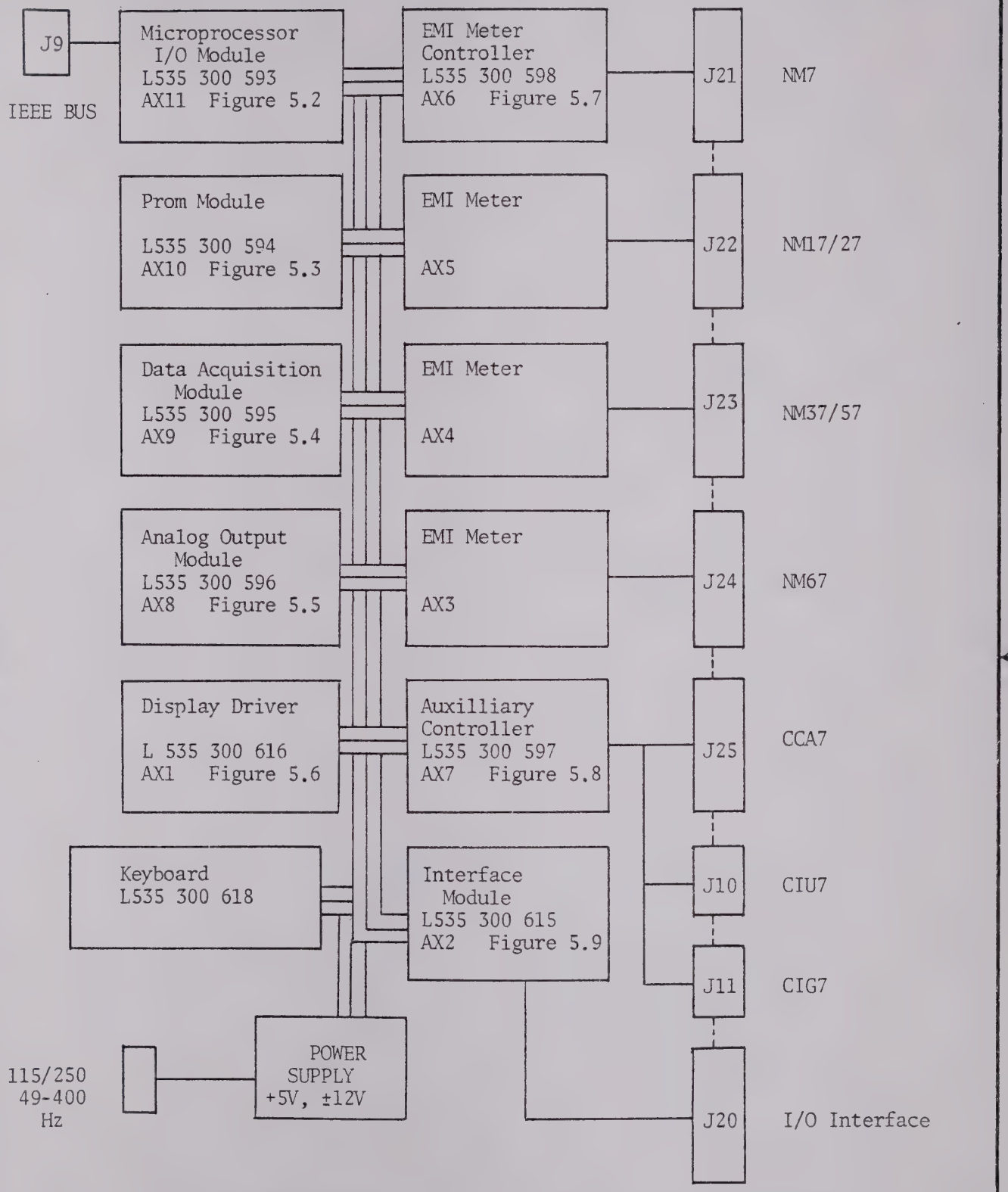
5.1 Basic Principles of Operation.

5.1.1 The Model CP7 Programmer is capable of controlling up to four separate EMI/FI Meters covering the frequency range of 20 Hz to 18 GHz. * . Each EMI/FI Meter is divided into either 8 bands, 7 bands ** or one band, with a total of 24 bands for all four EMI/FI meters.

5.1.2 The operator of the Model CP7 Programmer can also control the bandwidth and detector functions of the four EMI/FI meter. The calibration function of the EMI/FI meters is automatically set by the Model CP7. The Model CP7 controls a remote attenuator antenna switch (Input Unit Model CIU-7A). The Model CP7 Programmer multiplexes several outputs from the EMI/FI meters, digitizing only the signal from the EMI/FI meter selected.

5.1.3 The following block diagrams are supplied:

No.	TITLE	Librascope No.
Figure 5.1	Simplified Block Diagram	
Figure 5.2	MPU Module AX11	L535 300 593
Figure 5.3	Prom Module AX10	L535 300 594
Figure 5.4	Data Acquisition Moduel AX9	L535 300 595
Figure 5.5	Analog Output Module AX8	L535 300 596
Figure 5.6	Display Driver AX1	L535-300 616
Figure 5.7	EMI Meter Controller AX6-AX3	L535 300 598
Figure 5.8	Auxilliary Controller AX7	L535 300 597
Figure 5.9	Interface Module AX2	L535 300 615



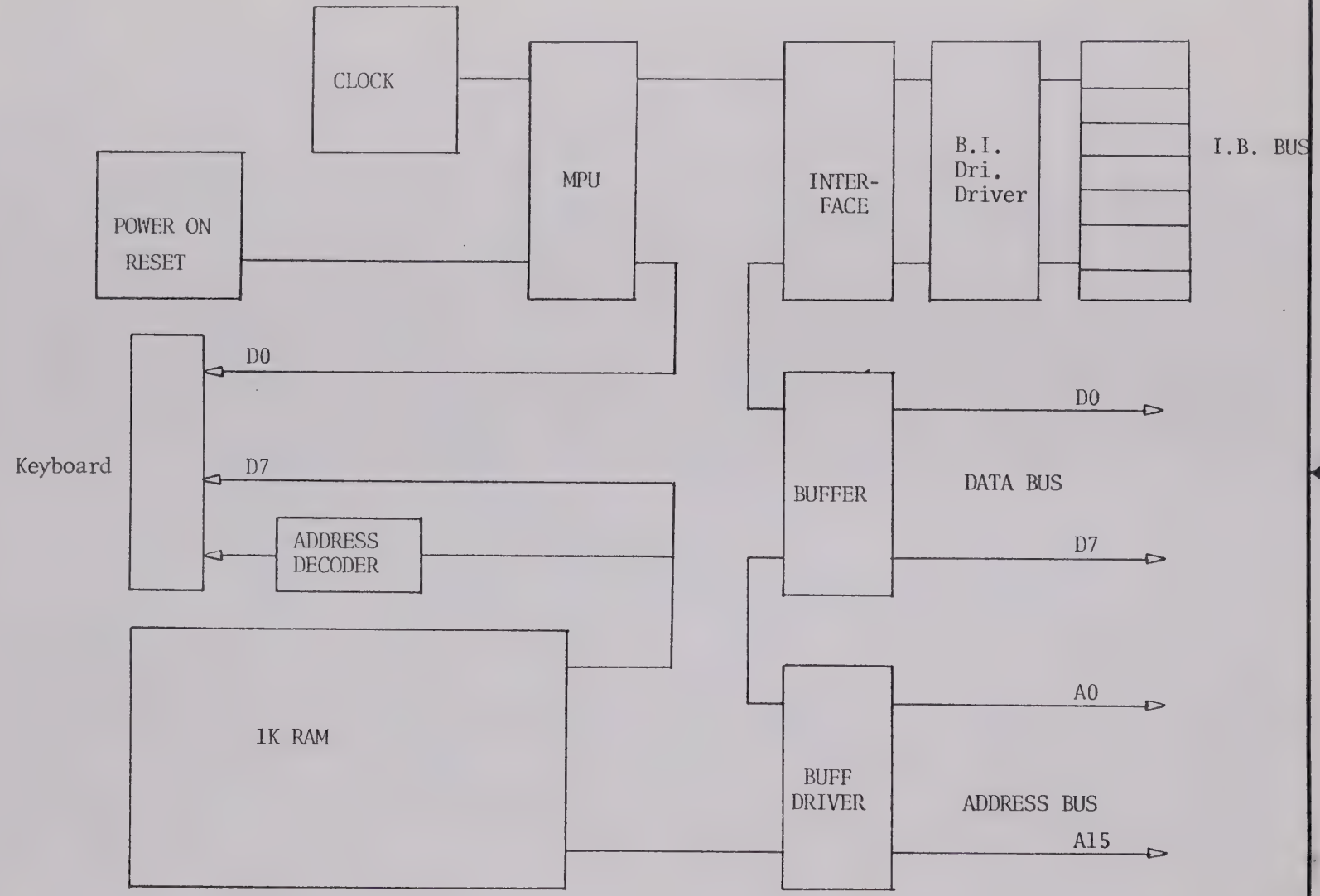
SINGER
LIBRASCOPE DIVISION

SIMPLIFIED BLOCK DIAGRAM

DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. FIGURE 5.1
ISSUED SEE PAGE 1	SCALE		SHEET 23 of 40

LIBRA NO.

2441-2 7/77



SINGER
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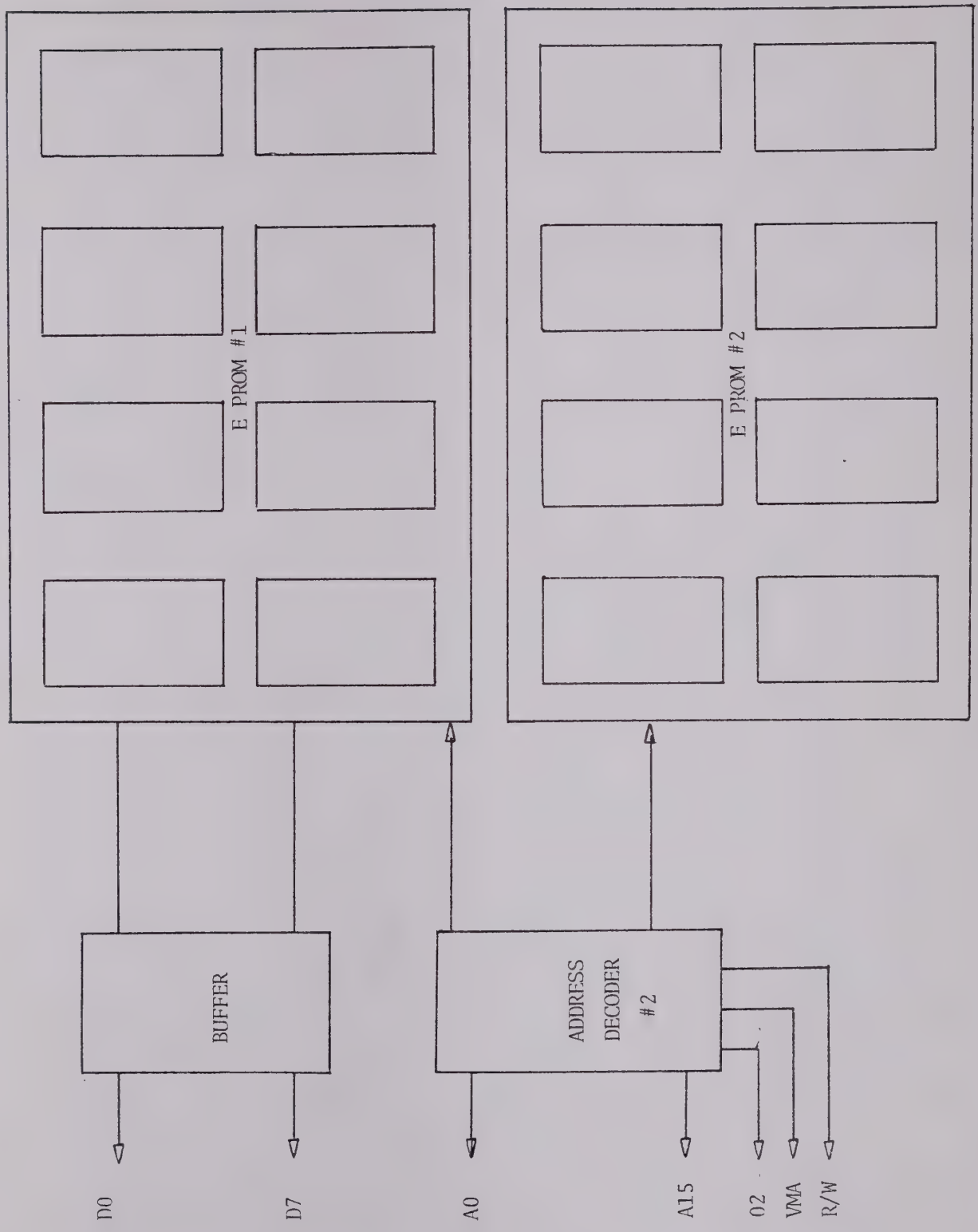
MPU MODULE A11

DRAWN	SEE PAGE 1
ISSUED	SEE PAGE 1
SIZE	A
FSCM NO.	36090
SCALE	
DWG NO.	FIGURE 5.2
SHEET	24 of 40

LIBRA NO.



SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. FIGURE 5.3
ISSUED SEE PAGE 1	SCALE		SHEET 25 of 40

PROM MODULE A10

LIBRA NO.

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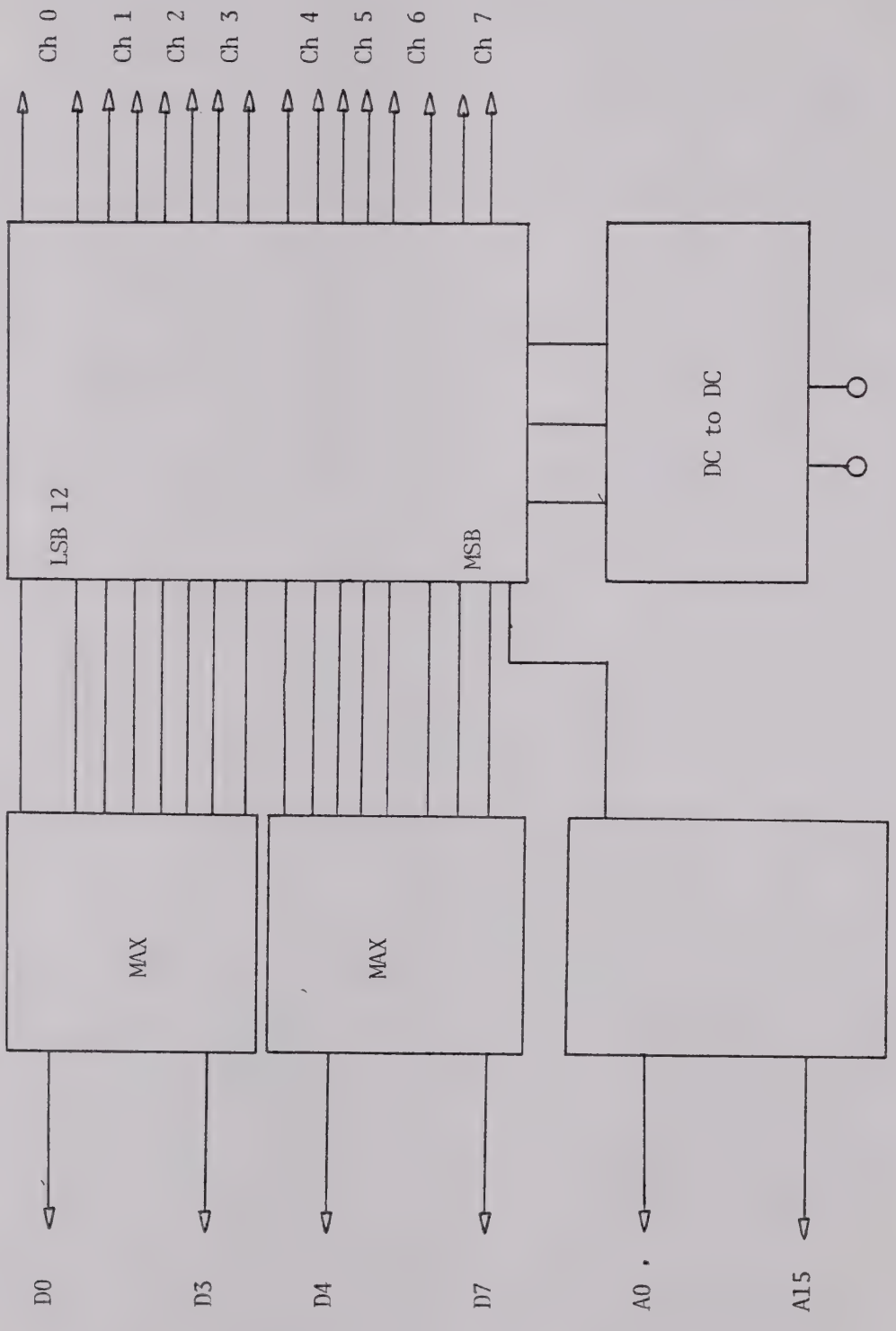
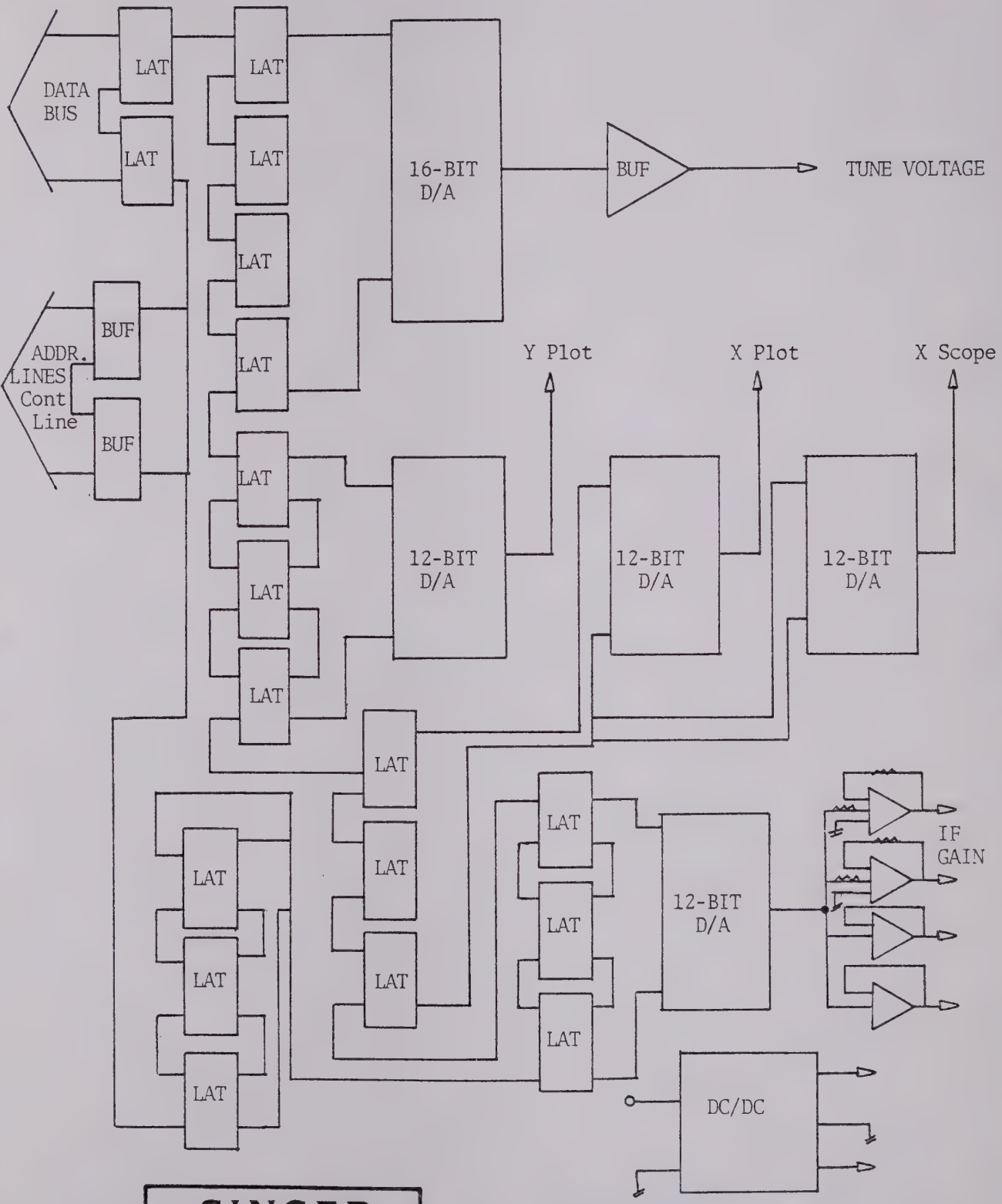


A 9 DATA ACQUISITION MODULE

SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. FIGURE 5.4
ISSUED SEE PAGE 1	SCALE		SHEET 26 of 40

LIBRA NO.

2441-2 7/77

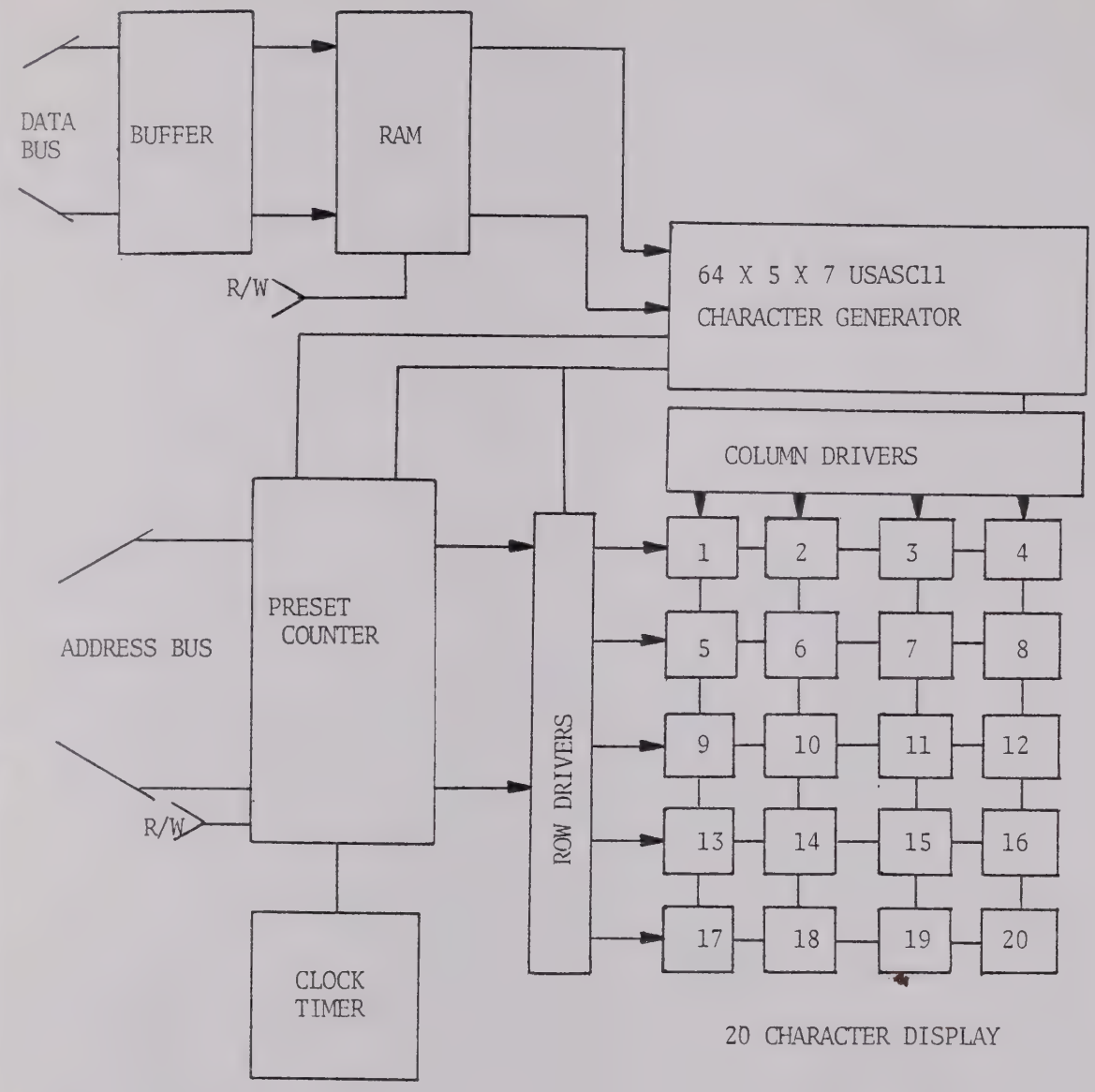


CP7 Card #4 D/A

SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. Figure 5.5 ANALOG OUTPUT
ISSUED SEE PAGE 1	SCALE		SHEET 27 of 40

LIBRA NO.

2441-2 7/77



SINGER LIBRASCOPE DIVISION			DISPLAY AND DRIVER	
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. Figure 5.6	
ISSUED SEE PAGE 1	SCALE			SHEET 28 of 40

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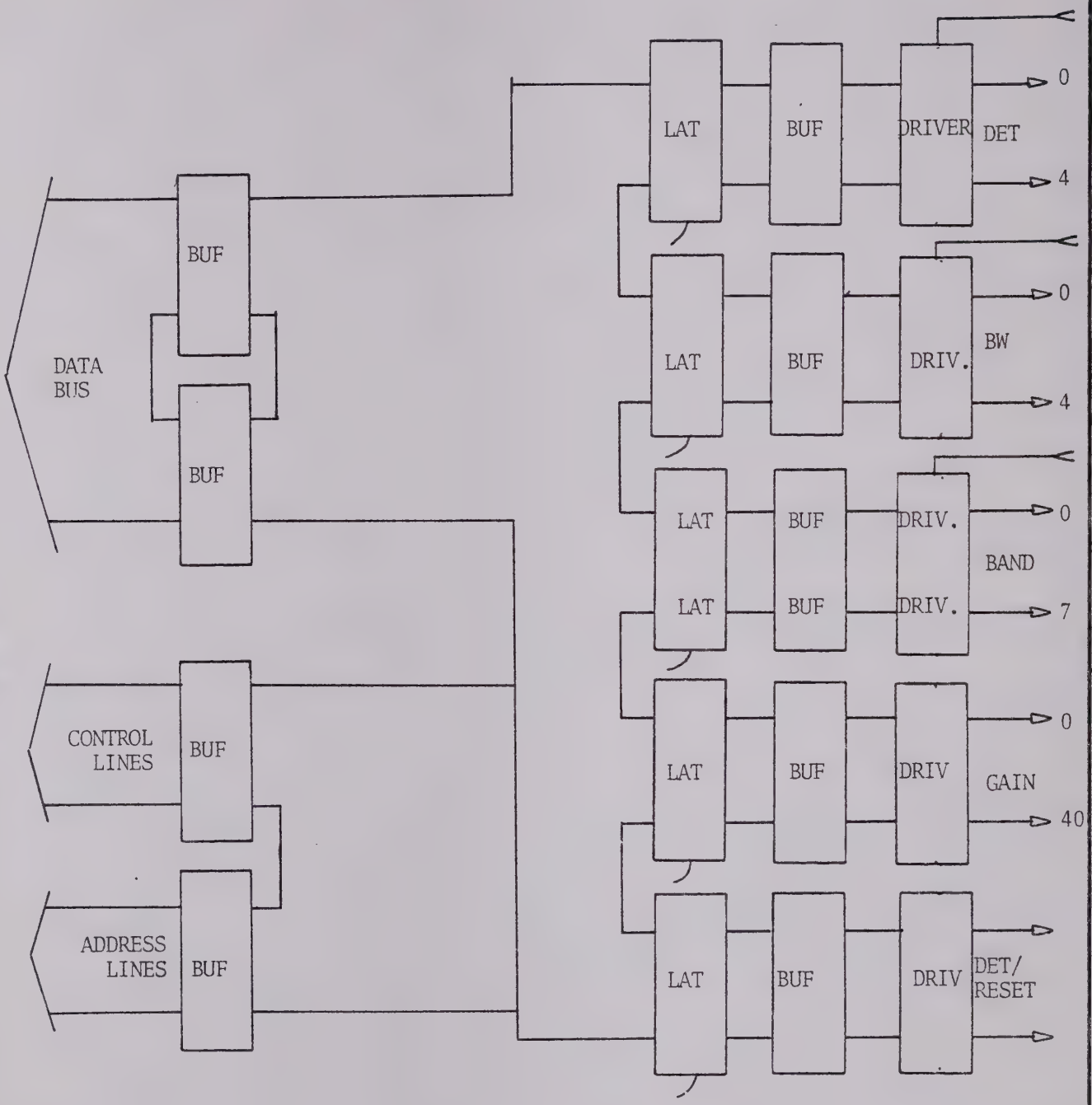
LIBRA NO.



SINGER LIBRASCOPE DIVISION	CP7A CARD #6-9/ RECEIVER DRIVER			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. EMI METER CONTROLLER FIGURE 5.7	
ISSUED SEE PAGE 1	SCALE			SHEET 29 of 40

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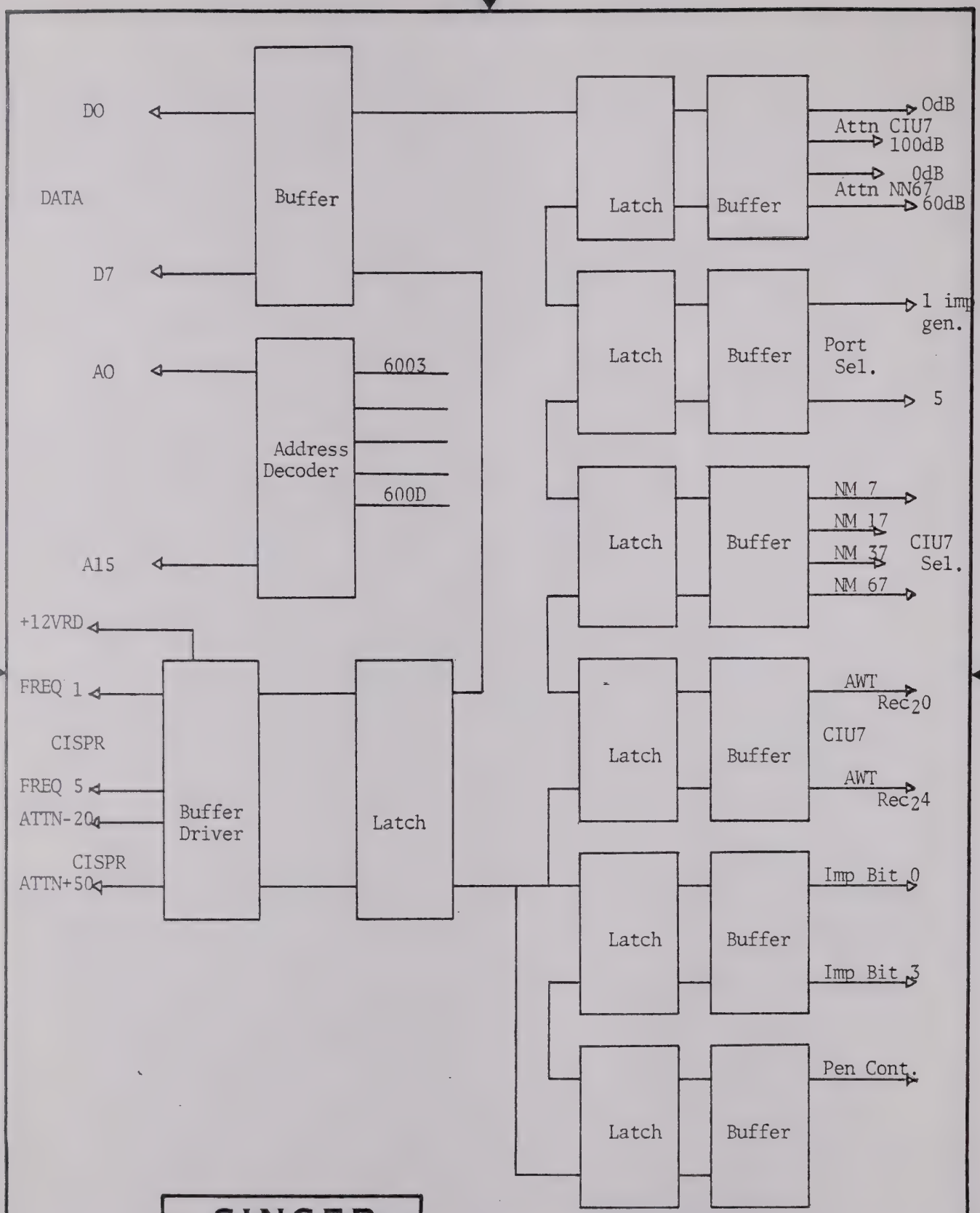
LIBRA NO.



SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. AUX CONTROLLER A5/Figure 5.8
ISSUED SEE PAGE 1	SCALE		SHEET 30 of 40

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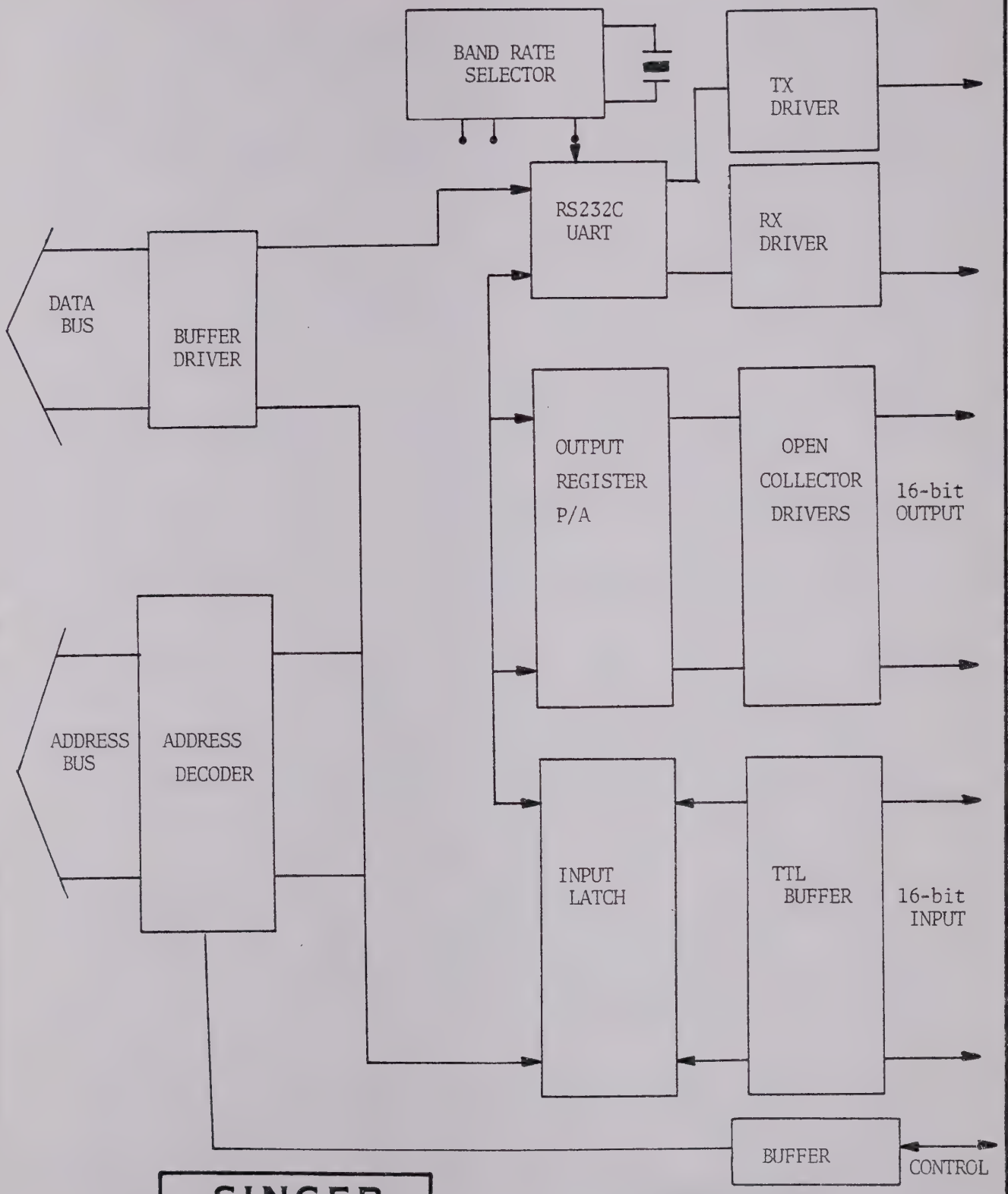
LIBRA NO.



SINGER LIBRASCOPE DIVISION			INTERFACE MODULE	
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. FIGURE 5.9	
ISSUED SEE PAGE 1	SCALE			SHEET 31 of 40

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LIBRA NO.

VI. CALIBRATION / MAINTENANCE

6.1 Calibration of Tune Voltage. The A8 board is calibrated through the use of the program (DAC 16-A) calibration offset.

6.1.1 Calibration is performed by connecting a five digit DVM which is capable of ± 0.005% accuracy to connector J67, Pin L. Voltage reading should be 0.000 V. Zero offset adjustment. Pot. R10. Reference Figure L535 300 596.

6.1.2 Calibration program DAC 16-B is used to calibrate full scale output. Repeat the above procedure, but adjust the gain control for the most positive full scale output. +10.240 VDC, Pot. R20. Reference Figure L 535 300 596.

6.1.3 Repeat this procedure, 6.1.1 and 6.1.2, until offset and gain are to electrical specifications.

6.2 Calibration of IF Gain Voltage A8 Card. Program DAC-IF:A is used.

6.2.1 Calibration is performed by connecting a five digit DVM which is capable of ± 0.005% accuracy to connector J7 pin; voltage reading should be -10.000 V zero offset adjustment. Pot. R30. Reference Figure L 535 300 596.

6.2.2 Calibration program DAC-IF:B is used to calibrate full scale output. Connect the DVM to J67, Pin j. Use gain control adjustment. Voltage reading should be +9.995 VDC. Reference Pot. RA), Figure L535 300 596.

6.2.3 Repeat these procedures, 6.2.1 and 6.2.2, until offset and gain are to electrical specifications.

6.3 Calibration of X-Axis for X-Y Recorder and CRT Display A8 Card. Program DAC (X-AXIS-0).

6.3.1 Calibration is performed by connecting a five digit DVM accuracy of ± 0.005% to X-axis for X-Y recorder. Voltage reading should be 0.000 V. Zero offset should be adjusted. Pot. R50, Figure

6.3.2 Calibration program (DAC X-axis full scale) is used to adjust full scale gain. Pot. R60, L535 300 596 . Voltage reading should be +4.998.

6.3.3 Repeat these procedures, 6.3.1 and 6.3.2, until offset and gain are to electrical specifications.

6.4 Calibration Y-Axis for X-Y Recorder and CRT Display A8 Card Program. (DAC Y-Axis-0).

6.4.1 Calibration is performed by connecting a five digit DVM accuracy of ± 0.005% to Y-axis for X-Y recorder. Adjust Pot. R60, Fig. L535 300 -596 . Connect the DVM to Y-axis for CRT display. Adjust Pot. R70, L535 300 596. Voltage reading should be 0.000 VDC.

6.4.2 Calibration program (DAC Y-Axis full scale) is used to adjust full scale gain. Pot. R80 is used to adjust X-Y recorder full scale voltage +4.998 VDC. Pot. R90 is used to adjust full scale gain for Y output for CRT display. Voltage reading should be +4.99 VDC.

6.4.3 Repeat these procedures, 6.4.1 and 6.4.2, until offset and gain are to electrical specifications.

VII. LIST OF PARTS

7.1 M68MM01 (D) -- Monoboard Microcomputer 1.

7.2 M68MM04 (D) -- 8K16K AROM/ROM Module.

7.3 M68MM0SA -- 8 Channel 12-bit A/D Module.

7.4 M68MM0SC -- 4 Channel 12-bit D/A Module.

7.5 M68MMCC10 -- Card Cage Specification.

7.6 12SW2SERIES1 -- Keyboard Specification.

7.7 HDBB -- 10SW Power One Specifications.

7.8 DE/200 Display Description.

7.9 40S1 Graphic System Reference IEEE Standard Number 488/1975.

7.10 1-500783-257 VII Series System Programmer.

7.11 Front Panel.

A. Hardware:

1. (30) Keyboard Switch
2. (1) Signal Switch
3. (1) 20 Character Display
4. (2) Circuit Boards
5. (1) Assembly Plate
6. (1) Front Cover
7. (1) Wire Harness

B. Electrical Diagram:

1. Keyboard Decoder
2. Display Control
3. Wire Harness Pin Data

7.12 Back Panel.

A. Hardware:

1. (6) 41-pin Connectors
2. (16) B.N.C. Connectors
3. (3) 19-pin Connectors
4. (1) Fuse Holder
5. (1) 3-pin Receptacle
6. (2) Microphone Jacks
7. (1) Wire Harness

B. Electrical Diagram:

1. Power Supply Circuitry
2. Program Pin Data
3. Antenna and Attenuator Pin Data

7.13 Card Cage.

A. Hardware:

1. (1) 10-Card Cage
2. Microprocessor I/O Module
3. PROM Module
4. Data Acquisition Module
5. Analog Output Module
6. Auxiliary Controller
7. EMI Meter Controller
8. Interface Module

7.13 Cont'd

B. Electrical Diagram:

1. Back Plain
2. Microprocessor I/O Module
3. PROM Module
4. Data Acquisition Module
5. Analog Output Module
6. Auxiliary Controller
7. EMI Meter Controller
8. Interface Module

7.14 Materials. See Table 7.1

MATERIALS

ITEM	NAME	PART NO.	MANUFACTURER
1	M.P.U	M68MM01	Motorola
2	MEM	m68MM04	Motorola
3	A/D	M68MM0SA	Motorola
4	D/A	M68MM0SC	Motorola
5	Wire Wrap	MEX68WW	Motorola
6	Card Card	M68MMCC10	Motorola
7	Card Card	M68MMCC5	Motorola
8	Keyboard	12SW3-19	Micro Switch
9	Switch	101SW11	Micro Switch
10	Button	2SW603-1	Micro Switch

Table 7.1 Cont'd

ITEM	NAME	PART NO.	MANUFACTURER
11	Display	DE/200	Digital Elect.
12	Display	Power Supply	Digital Elect.
13	Power Supply	HDBB-10SW	Power - One
14	D/A 16-bit	DAC70-CSB-I	Burr Brown
15	Oper. Amp.	BB3S00C	Burr Brown
16	Buffer Amp .	BB3329	Burr Brown
17	DC to DC	BB Model 546	Burr Brown
18	Log Amp.	BB4127JG	Burr Brown
19	Connector	KPTM02A20-41P	ITT
20	Connector	KPTM02A14-19P	ITT
21	BNC Connector	UG1094A/U	King Elect.
22	Jack Phone Connector	13B	Switchcraft
23	Wire Wrap Socket	316-AG36F	Augut
24	Wire Wrap Socket	314-AG36F	Augut
25	Pin Terminals	314-17PS	Augut
26	Cable Assembly	25-65-48	3M
27	IC	SN74LS175N	TI
	IC	74LS174	TI
	IC	7407	TI
	IC	7406	TI
	IC	74LS00	TI
	IC	74LS138	TI
	IC	74LS04	TI
	IC	74S04N	TI
	IC	74LS21	TI
	IC	74LS74	TI
	IC	74LS32	TI
	IC	74148	TI
	IC	Q2T2222	TI
	IC	N8T97B	Signetics
	IC	N8T26B	Signetics

VIII. DRAWING LIST

TITLE	LIBRASCOPE NO.	CARD POSITION
TOP ASSEMBLY CP7	L200 024 705	
POWER SUPPLY (POWER ONE SUPPLEMENT)		
CIRCUIT CARD ASSEMBLY -- MICROPROCESSOR I/O MODULE	L535 300 593	A 11
SCHEMATIC DIAGRAM -- MICROPROCESSOR I/O MODULE	L543 200 593	
CIRCUIT CARD ASSEMBLY -- PROM MODULE	L535 300 594	A 10
SCHEMATIC DIAGRAM -- PROM MODULE	L543 200 594	
CIRCUIT CARD ASSEMBLY -- DATA ACQUISITION MODULE	L535 300 595	A 9
SCHEMATIC DIAGRAM -- DATA ACQUISITION MODULE	L543 200 595	
CIRCUIT CARD ASSEMBLY -- ANALOG OUTPUT MODULE	L535 300 596	A 8
SCHEMATIC DIAGRAM -- ANAOLG OUTPUT MODULE	L543 200 596	
CIRCUIT CARD ASSEMBLY -- AUXILIARY CONTROLLER	L535 300 597	A 7
SCHEMATIC DIAGRAM -- AUXILAIRY CONTROLLER	L543 200 597	
CIRCUIT CARD ASSEMBLY -- EMI METER CONTROLLER	L535 300 598	A 6-3
SCHEMATIC DIAGRAM -- EMI METER CONTROLLER	L543 200 598	
CIRCUIT CARD ASSEMBLY -- INTERFACE MODULE	L535 300 615	A 2
SCHEMATIC DIAGRAM -- INTERFACE MODULE	L543 200 615	
CIRCUIT CARD ASSEMBLY -- DISPLAY DRIVER	L535 300 616	A 1
SCHEMATIC DIAGRAM -- DISPLAY DRIVER	L543 200 616	
CIRCUIT CARD ASSEMBLY -- KEYBOARD	L535 300 618	
SCHEMATIC DIAGRAM -- KEYBOARD	L543 200 618	

IX. WIRING HARNESS LISTING

CP7

OPERATOR'S HANDBOOK

L 191 000 650

SINGER LIBRASCOPE DIVISION				
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L 541 003 466	
ISSUED SEE PAGE 1	SCALE			SHEET 39 of 40

LIBRA NO.

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
L200 024705	CP7				

SECTION 1
WIRING HARNESS LISTING

CONTENTS AND SHEET DESIGNATIONS			
SECTION 1 WIRING HARNESS	COVER SHEETS 1–1 THRU 1–6	EDP LISTING SH 1 THRU 9	SHEETS TOTAL 34
SECTION 2 WIRING DIAGRAM	COVER SHEET 2–1	EDP LISTING SH 1 THRU 18	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS

DECIMAL	ANGULAR
2 PLACE ± .02	±1°
3 PLACE ± .010	
4 PLACE ± .0005	

DO NOT SCALE THIS DRAWING

DR 9-12-77
CHK
APPD 9/19/77

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

WIRING HARNESS, CP7
ASSEMBLY

MATERIAL

SIZE	CODE IDENT NO.	DWG NO.
A	36090	L541003466

SCALE —

SHEET 1-1 OF 34

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REVISION STATUS OF SHEETS

SHEET NO.	REVISION	SHEET NO.	REVISION
1-1			
1-2			
1-3			
1-4			
1-5			
1-6			
EDP SECT 1			
2-1			
EDP SECT 2			

REV LTR	SIZE	CODE IDENT NO.	DWG NO.
	A	36090	L541003466
	SCALE —		SHEET 1-2

NOTES:

1. PREPARED IN ACCORDANCE WITH MIL-STD-100

2. MIL-STD-12 APPLIES EXCEPT AS FOLLOWS:

   LETTERS CD, $\frac{C}{D}$, AND CLR CDE DENOTE CODE

ENG NOTE AND ENG NTE	ENGINEERING NOTE
FR-IN ITEM	FROM-INSTALL FIND NO.
IT EM	FIND NO.
WIRE LETTERS LNGTH	DENOTE WIRE LENGTH

   LETTERS IN A CODE COLUMN ON EDP LISTING SHALL BE INTERPRETED AS FOLLOWS:

LETTER	A	DENOTES	CABLE, SHIELDED
	B		BLACK
	R		RED
	T		CABLE, TWISTED
	W		WHITE
LETTER	C	DENOTES	COAXIAL (RADIO FREQUENCY)

   THE ALPHA "AA", "BB", ETC. SHOWN IN THE SHLD GRP COLUMN INDICATE THE SHIELDS ARE COMMON AND ARE TIED TOGETHER IN A BUTT SPLICE. EACH ALPHA INDICATES A DIFFERENT SHIELD GROUP

   ()) PRECEEDING A WIRE NO. DENOTES A JUMPER WIRE

   (*) PRECEEDING A LETTER DENOTES A LOWER CASE LETTER

3. TOLERANCE ON WIRE LENGTHS: +5 PCT

4. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQT 5

5. PARTIAL REF DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH

SINGER LIBRASCOPE DIVISION				
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L54100346 6	REV
ISSUED SEE PAGE 1	SCALE			SHEET 1 – 3

LIBRA NO.

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6. MARK WIRE NUMBERS AT 4 INCH MAX INTERVALS ON ALL WIRES LONGER THAN 4 INCHES USING WIRE MARKING FOIL PER MIL-M-81594, TYPE AS APPLICABLE

7. MARK BAND MARKERS, FIND NO. 12 WITH .09 HIGH CHARACTERS USING WIRE MARKING FOIL PER MIL-M-81594, TYPE VI. SEE FIGURE 1

8. TWIST WIRES, OF LINK WIRE NO. WITH DIFFERENT COLOR TOGETHER WHERE THEY RUN PARALLEL

9. WIRING PROCEDURE PER MIL-STD-454, REQT 69

10. MARK CONNECTOR REF DESIGNATIONS ON BAND MARKER USING WIRE MARKING FOIL PER MIL-M-81594 TYPE VI. AFFIX TO HARNESS

11. REFERENCES:

    A. ELECTRICAL SCHEMATIC DIAGRAM
       DWG NO.

    B. MECHANICAL ASSEMBLY
       DWG NO. L200 024705

SINGER LIBRASCOPE DIVISION					
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L541003466		REV
ISSUED SEE PAGE 1	SCALE			SHEET 1-4	

LIBRA NO.

LIST OF MATERIAL

ITEM	REQD	PART NO.		DESCRIPTION
1	A/R	L100000687	M81044/12-24-9	WIRE ELEC AWG 24 WHT
2	A/R	L100000685	M81044/12-24-0	WIRE ELEC AWG 24 BLK
3	276	3184849-1		CONTACT ELEC
4	3	3184848		CONNECTOR ELEC P1, 2, 3
5	3	3184851-1		JACKSCREW ASSY
6	6	T5200272202		CONNECTOR ELEC J20 THRU J25
7	3	T5200272201		J9 THRU J11
8	2	L5200113340	CN13B	J3, J7
9	1	L5200113339	6J4	J8
10	13	L5200046088	UG1094 A/U	J1, 2, 4, 5, 6, 12-19
11	1	L5200113331		CONNECTOR ELEC J26
12	4	L3360033711	MS3368-1-9A	STRAP IDENT
13				
14				
15	A/R	T1005006251	2846619-25	WIRE ELEC AWG 16 WHT
16	A/R	T1005006271	2846619-27	WIRE ELEC AWG 20 WHT
17	1	L5400004061	MS25036-145	TERMINAL LUG
18	28	H947902005	MS25036-102	TERMINAL LUG

SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L5410034661
ISSUED SEE PAGE 1	SCALE		SHEET 1–5

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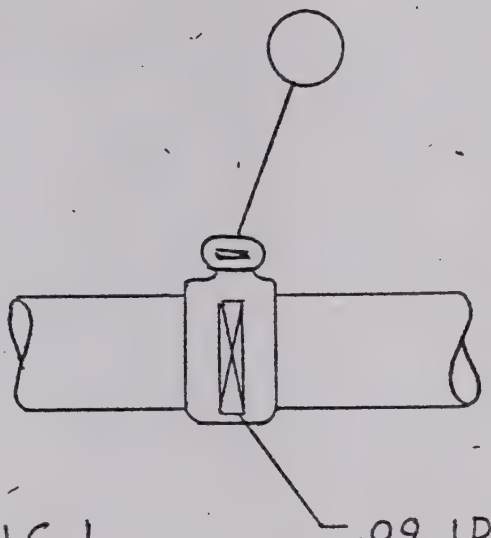

FIG 1

L541003466
P1
P2
P3

SINGER LIBRASCOPE DIVISION				
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L541003466	
ISSUED SEE PAGE 1	SCALE			SHEET 1-6

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WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0000		*			P3	A14	03		J26	001		
0001		01	024		P3	B07	03		J09	A		
0002		01	024		P3	B08	03		J09	B		
0003		01	024		P3	B09	03		J09	C		
0004		01	024		P3	B10	03		J09	D		
0005		01	024		P3	B11	03		J09	E		
0006		01	024		P3	B12	03		J09	F		
0007		01	024		P3	B13	03		J09	G		
0008		01	024		P3	B14	03		J09	H		
0009		01	024		P3	C08	03		J09	J		
0010		01	024		P3	C09	03		J09	K		
0011		01	024		P3	C05	03		J09	L		
0012		01	024		P3	C12	03		J09	M		
0013		01	024		P3	C11	03		J09	N		
0014		01	024		P3	C10	03		J09	P		
0015		01	024		P3	C07	03		J09	R		
0016		01	024		P3	C06	03		J09	S		
0017		01	024		P3	C13	03		J09	T		
0018		01	024		P3	C14	03		J09	U		
0019		01	024		P3	D01	03		J09	V		
0020		01	024		P3	F02	03		J25	Z		
0021		01	024		P3	F03	03		J25	*T		
0022		01	024		P3	F06	03		J25	A		
0023		01	024		P3	F07	03		J25	B		
0024		01	024		P3	F08	03		J25	C		
0025		01	024		P3	E06	03		J25	D		
0026		01	024		P3	E07	03		J25	E		
0027		01	024		P3	F11	03		J25	F		
0028		01	024		P3	F12	03		J25	G		
0029		01	024		P3	F13	03		J25	H		
0030		01	024		P3	F14	03		J25	J		
0031		01	024		P3	F15	03		J25	K		
0032		01	024		P3	F18	03		J25	L		
0033		01	024		P3	F17	03		J25	M		
0034		01	024		P3	G05	03		J25	N		
0035		01	024		P3	F16	03		J25	P		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0036		01	024		P3	G06	03		J25	*A		
0037		01	024		P3	G07	03		J25	*B		
0038		01	024		P3	G08	03		J25	*T		
0039		01	024		P3	G09	03		J10	A		
0040		01	024		P3	G10	03		J10	B		
0041		01	024		P3	G11	03		J10	C		
0042		01	024		P3	G12	03		J10	D		
0043		01	024		P3	G13	03		J10	E		
0044		01	024		P3	G14	03		J10	F		
0045		01	024		P3	H05	03		J10	G		
0046		01	024		P3	H06	03		J10	H		
0047		01	024		P3	H07	03		J10	J		
0048		01	024		P3	H08	03		J10	K		
0049		01	024		P3	H09	03		J10	L		
0050		01	024		P3	H10	03		J10	M		
0051		01	024		P3	H11	03		J10	N		
0052		01	024		P3	H12	03		J10	P		
0053		01	024		P3	H13	03		J10	R		
0054		01	024		P3	D08	03		J10	V		
0055		01	024		P3	H14	03		J11	A		
0056		01	024		P3	D05	03		J11	C		
0057		01	024		P3	D06	03		J11	E		
0058		01	024		P3	J07	03		J11	G		
0059		01	024		P3	J08	03		J11	K		
0060		01	024		P3	J09	03		J11	M		
0061		01	024		P3	J10	03		J11	N		
0062		01	024		P3	J11	03		J11	P		
0063		01	024		P3	J12	03		J11	R		
0064		01	024		P3	J13	03		J11	S		
0065		01	024		P3	F05	03		K1	X2		
0066		01	024		P2	A10	03		J21	A		
0067		01	024		P2	A11	03		J21	B		
0068		01	024		P2	A12	03		J21	C		
0069		01	024		P2	A13	03		J21	D		
0070		01	024		P2	A14	03		J21	E		
0071		01	024		P2	B05	03		J21	F		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0072		01	024		P2	C07	03		J21	G		
0073		01	024		P2	B06	03		J21	H		
0074		01	024		P2	A05	03		J21	J		
0075		01	024		P2	B07	03		J21	K		
0076		01	024		P2	C12	03		J21	L		
0077		01	024		P2	B09	03		J21	M		
0078		01	024		P2	B08	03		J21	N		
0079		01	024		P2	B10	03		J21	P		
0080		01	024		P2	B11	03		J21	S		
0081		01	024		P2	C13	03		J21	U		
0082		01	024		P2	B12	03		J21	W		
0083		01	024		P2	B13	03		J21	X		
0084		01	024		P2	C10	03		J21	Y		
0085		01	024		P2	B14	03		J21	Z		
0086		01	024		P2	A09	03		J21	*A		
0087		01	024		P2	A08	03		J21	*D		
0088		01	024		P2	A07	03		J21	*F		
0089		01	024		P2	A06	03		J21	*G		
0090		01	024		P2	C05	03		J21	*H		
0091		01	024		P2	C06	03		J21	*I		
0092		01	024		P2	C14	03		J21	*J		
0093		01	024		P2	J11	03		J21	*P		
0094	B	02	024		P2	D01	03		J12	002		
0094	W	01	024		P2	C08	03		J12	001		
0095	B	02	024		P2	J12	03		J13	002		
0095	W	01	024		P2	J13	03		J13	001		
0098		01	024		P2	D07	03		J22	A		
0099		01	024		P2	D09	03		J22	B		
0100		01	024		P2	H09	03		J22	C		
0101		01	024		P2	H10	03		J22	D		
0102		01	024		P2	D11	03		J22	E		
0103		01	024		P2	D12	03		J22	F		
0104		01	024		P2	E06	03		J22	G		
0105		01	024		P2	D13	03		J22	H		
0106		01	024		P2	D02	03		J22	J		
0107		01	024		P2	D14	03		J22	K		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0108		01	024		P2	H11	03		J22	L		
0109		01	024		P2	D16	03		J22	M		
0110		01	024		P2	D15	03		J22	N		
0111		01	024		P2	C11	03		J22	P		
0112		01	024		P2	D18	03		J22	S		
0113		01	024		P2	H12	03		J22	U		
0114		01	024		P2	E01	03		J22	W		
0115		01	024		P2	E02	03		J22	X		
0116		01	024		P2	H13	03		J22	Y		
0117		01	024		P2	E03	03		J22	Z		
0118		01	024		P2	D06	03		J22	*A		
0119		01	024		P2	D05	03		J22	*D		
0120		01	024		P2	D04	03		J22	*F		
0121		01	024		P2	D03	03		J22	*G		
0122		01	024		P2	E04	03		J22	*H		
0123		01	024		P2	E05	03		J22	*I		
0124		01	024		P2	E13	03		J22	*J		
0125		01	024		P2	G14	03		J22	*P		
0126	B	02	024		P2	E12	03		J14	002		
0126	W	01	024		P2	E07	03		J14	001		
0127	B	02	024		P2	E14	03		J15	002		
0127	W	01	024		P2	H14	03		J15	001		
0130		01	024		P2	F02	03		J23	A		
0131		01	024		P2	F03	03		J23	B		
0132		01	024		P2	F04	03		J23	C		
0133		01	024		P2	F05	03		J23	D		
0134		01	024		P2	F06	03		J23	E		
0135		01	024		P2	F07	03		J23	F		
0136		01	024		P2	G05	03		J23	G		
0137		01	024		P2	F08	03		J23	H		
0138		01	024		P2	E15	03		J23	J		
0139		01	024		P2	H05	03		J23	K		
0140		01	024		P2	G10	03		J23	L		
0141		01	024		P2	F11	03		J23	M		
0142		01	024		P2	H06	03		J23	N		
0143		01	024		P2	F12	03		J23	P		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0144		01	024		P2	F13	03		J23	S		
0145		01	024		P2	G09	03		J23	U		
0146		01	024		P2	F14	03		J23	W		
0147		01	024		P2	F15	03		J23	X		
0148		01	024		P2	G08	03		J23	Y		
0149		01	024		P2	F16	03		J23	Z		
0150		01	024		P2	F01	03		J23	*A		
0151		01	024		P2	E18	03		J23	*D		
0152		01	024		P2	E17	03		J23	*F		
0153		01	024		P2	F16	03		J23	*G		
0154		01	024		P2	F17	03		J23	*H		
0155		01	024		P2	F18	03		J23	*I		
0156		01	024		P2	G12	03		J23	*J		
0157		01	024		P2	H07	03		J23	*P		
0158	B	02	024		P2	G11	03		J16	002		
0158	W	01	024		P2	G06	03		J16	001		
0159	B	02	024		P2	G13	03		J17	002		
0159	W	01	024		P2	G07	03		J17	001		
0160	B	02	024		P1	J06	03		J01	002		
0160	W	01	024		P1	J05	03		J01	001		
0161	B	02	024		P1	J08	03		J02	002		
0161	W	01	024		P1	J07	03		J02	001		
0162	B	02	024		P1	J10	03		J05	002		
0162	W	01	024		P1	J09	03		J05	001		
0168		01	024		P1	A10	03		J24	A		
0169		01	024		P1	A11	03		J24	B		
0170		01	024		P1	A12	03		J24	C		
0171		01	024		P1	A13	03		J24	D		
0172		01	024		P1	A14	03		J24	E		
0173		01	024		P1	B05	03		J24	F		
0174		01	024		P1	C07	03		J24	G		
0175		01	024		P1	B06	03		J24	H		
0176		01	024		P1	A05	03		J24	J		
0177		01	024		P1	B07	03		J24	K		
0178		01	024		P1	C12	03		J24	L		
0179		01	024		P1	B09	03		J24	M		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0180		01	024		P1	B08	03		J24	N		
0181		01	024		P1	B10	03		J24	P		
0182		01	024		P1	B11	03		J24	S		
0183		01	024		P1	C11	03		J24	U		
0184		01	024		P1	B12	03		J24	W		
0185		01	024		P1	B13	03		J24	X		
0186		01	024		P1	C10	03		J24	Y		
0187		01	024		P1	B14	03		J24	Z		
0188		01	024		P1	A09	03		J24	*A		
0189		01	024		P1	A08	03		J24	*D		
0190		01	024		P1	A07	03		J24	*F		
0191		01	024		P1	A06	03		J24	*G		
0192		01	024		P1	C05	03		J24	*H		
0193		01	024		P1	C06	03		J24	*I		
0194		01	024		P1	C14	03		J24	*J		
0195		01	024		P1	D02	03		J20	A		
0196		01	024		P1	D04	03		J20	B		
0197		01	024		P1	D03	03		J20	C		
0198		01	024		P1	F05	03		J20	D		
0199		01	024		P1	F07	03		J20	E		
0200		01	024		P1	F08	03		J20	F		
0201		01	024		P1	G09	03		J20	G		
0202		01	024		P1	D05	03		J20	H		
0203		01	024		P1	D06	03		J20	J		
0204		01	024		P1	D07	03		J20	K		
0205		01	024		P1	D08	03		J20	L		
0206		01	024		P1	G08	03		J20	M		
0207		01	024		P1	G07	03		J20	N		
0208		01	024		P1	D11	03		J20	P		
0209		01	024		P1	D12	03		J20	R		
0210		01	024		P1	D13	03		J20	S		
0211		01	024		P1	D14	03		J20	T		
0212		01	024		P1	D15	03		J20	U		
0213		01	024		P1	D16	03		J20	V		
0214		01	024		P1	D17	03		J20	W		
0215		01	024		P1	D18	03		J20	X		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0216		01	024		P1	E01	03		J20	Y		
0217		01	024		P1	E02	03		J20	Z		
0218		01	024		P1	E03	03		J20	*A		
0219		01	024		P1	F05	03		J20	*B		
0220		01	024		P1	E06	03		J20	*C		
0221		01	024		P1	E07	03		J20	*D		
0222		01	024		P1	F11	03		J20	*E		
0223		01	024		P1	F12	03		J20	*F		
0224		01	024		P1	F13	03		J20	*G		
0225		01	024		P1	F14	03		J20	*H		
0226		01	024		P1	E12	03		J20	*I		
0227		01	024		P1	E13	03		J20	*J		
0228		01	024		P1	E14	03		J20	*K		
0229		01	024		P1	E15	03		J20	*M		
0230		01	024		P1	E16	03		J20	*N		
0231		01	024		P1	E17	03		J20	*P		
0232		01	024		P1	E18	03		J20	*Q		
0233		01	024		P1	F01	03		J20	*R		
0234		01	024		P1	F02	03		J20	*S		
0235		01	024		P1	F03	03		J20	*T		
0236	B	02	024		P1	G05	03		J06	002		
0236	W	01	024		P1	F04	03		J06	001		
0237	B	02	024		P1	G06	03		J04	002		
0237	W	01	024		P1	F06	03		J04	001		
0240		01	024		P3	D12	03		J24	*E		
0241		01	024		P3	D14	03		J24	*P		
0242		01	024		P3	D13	03		J24	*Q		
0243		01	024		P3	D15	03		J24	*R		
0244	B	02	024		P1	C13	03		J18	002		
0244	W	01	024		P1	C08	03		J18	001		
0245	B	02	024		P1	D01	03		J19	002		
0245	W	01	024		P1	C09	03		J19	001		
0248		01	024		K1	A1			J03	TIP		
0249		01	024		K1	A2			J03	SLV		
0250		01	024		K1	A3			J03	RNG		
0251		01	024		K1	B1			J07	TIP		

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0252		01	024		K1	B2			J07	SLV		
0253		01	024		K1	B3			J07	RNG		
0254		01	036		K1	X1			TB1	A05	17	
0255		*			PS1	002			A4	POS		
0256		*			PS1	003			A4	NEG		
0257		15	024		J08	AC			K2	001		
0258		15	024		J08	AC			K2	003		
0259		15	004		J08	ACC			J08	C		
0260		15	024		J08	ACC			PS1T1	001		
0261		15	048		J08	C			S1	A		
0262		15	024		J08	D			PS1T1	003		
0263		15	024		J08	E			PS1T1	002		
0264		15	024		J08	F			PS1T1	004		
0265		15	024		K2	004			PS1T1	004		
0266		15	048		K2	002			S1	D		
0267		16	048		TB1	A02	18		S1	Z		
0268		16	048		TB1	A03	18		S1	Y		
0269		16	004		S1	X			S1	Z		
0270		16	024		P1	H05	03		TB1	B03	18	
0271		16	024		P1	H06	03		TB1	B03	18	
0272		16	024		P1	H07	03		TB1	B04	18	
0273		16	024		P1	H08	03		TB1	B04	18	
0274		16	024		P1	H09	03		TB1	B01	18	
0275		16	024		P1	H10	03		TB1	B01	18	
0276		16	024		P1	H11	03		TB1	B02	18	
0277		16	024		P1	H12	03		TB1	B02	18	
0278		16	024		P1	H13	03		TB1	B05	18	
0279		16	024		P1	H14	03		TB1	B05	18	
0280		16	024		P1	G10	03		TB1	B06	18	
0281		16	024		P1	G11	03		TB1	B06	18	
0282		16	024		P1	G12	03		TB1	B07	18	
0283		16	024		P1	G13	03		TB1	B07	18	
0284		16	024		P1	G14	03		TB1	B08	18	
0285		16	024		P1	F18	03		TB1	B08	18	
0286		15	024		PS1	001			TB1	A01	18	
0287		15	024		PS1	002			TB1	A02	18	

WIRE NO	CD	ITEM NO	WIRE LNGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0288		15	024		PS1	003			TB1	A03	18	
0289		15	024		PS1	004			TB1	A03	18	
0290		15	024		PS1	005			TB1	A05	18	
0291		15	024		PS1	006			TB1	A06	18	
0292		15	024		PS1	009			TB1	A07	18	
0293		15	024		PS1	010			TB1	A08	18	
0294		15	024		PS1	007			TB1	A04	18	
0295		15	024		PS1	008			TB1	A04	18	
0296		01	024		P3	F04	03		J25	Y		
1111		*			P3	A13	03		J26	002		
2222		*			P3	A12	03		J26	003		
3333		*			P3	A11	03		J26	004		
4444		*			P3	A10	03		J26	005		
5555		*			P3	A09	03		J26	006		
6666		*			P3	B05	03		J26	007		
7777		*			P3	A07	03		J26	008		
8888		*			P3	A08	03		J26	009		
9099		*			P3	A05	03		J26	011		
9199		*			P3	A06	03		J26	012		
9999		*			P3	B06	03		J26	010		

SECTION 2

1. THE FOLLOWING IS A WIRING DIAGRAM LISTING AND IS INCLUDED AS REFERENCE INFORMATION FOR COMPONENT HOOKUP

REV LTR	SIZE	CODE IDENT NO.	DWG NO.
	A	36090	L541003466
	SCALE —		SHEET 2-1

DIAGRAM LIST S0005-2 UNIT MARK - DWG NO. L541003466 REV 00 PAGE 1

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	A4	NEG		0256		*			PS1	003	
	A4	POS		0255		*			PS1	002	
	J01	001		0160	W	01			P1	J05	
	J01	002		0160	B	02			P1	J06	
	J02	001		0161	W	01			P1	J07	
	J02	002		0161	B	02			P1	J08	
	J03	RNG		0250		01			K1	A3	
	J03	SLV		0249		01			K1	A2	
	J03	TIP		0248		01			K1	A1	
	J04	001		0237	W	01			P1	F06	
	J04	002		0237	B	02			P1	G06	
	J05	001		0162	W	01			P1	J09	
	J05	002		0162	B	02			P1	J10	
	J06	001		0236	W	01			P1	F04	
	J06	002		0236	B	02			P1	G05	
	J07	RNG		0253		01			K1	B3	
	J07	SLV		0252		01			K1	B2	
	J07	TIP		0251		01			K1	B1	
	J08	C	)	0259		15			J08	ACC	
	J08	C		0261		15			S1	A	
	J08	D		0262		15			PS1T1	003	
	J08	E		0263		15			PS1T1	002	
	J08	F		0264		15			PS1T1	004	
	J08	AC		0257		15			K2	001	
	J08	AC		0258		15			K2	003	
	J08	ACC	)	0259		15			J08	C	
	J08	ACC		0260		15			PS1T1	001	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J09	A		0001		01			P3	B07	
	J09	B		0002		01			P3	B08	
	J09	C		0003		01			P3	B09	
	J09	D		0004		01			P3	B10	
	J09	E		0005		01			P3	B11	
	J09	F		0006		01			P3	B12	
	J09	G		0007		01			P3	B13	
	J09	H		0008		01			P3	B14	
	J09	J		0009		01			P3	C08	
	J09	K		0010		01			P3	C09	
	J09	L		0011		01			P3	C05	
	J09	M		0012		01			P3	C12	
	J09	N		0013		01			P3	C11	
	J09	P		0014		01			P3	C10	
	J09	R		0015		01			P3	C07	
	J09	S		0016		01			P3	C06	
	J09	T		0017		01			P3	C13	
	J09	U		0018		01			P3	C14	
	J09	V		0019		01			P3	D01	
	J10	A		0039		01			P3	G09	
	J10	B		0040		01			P3	G10	
	J10	C		0041		01			P3	G11	
	J10	D		0042		01			P3	G12	
	J10	E		0043		01			P3	G13	
	J10	F		0044		01			P3	G14	
	J10	G		0045		01			P3	H05	
	J10	H		0046		01			P3	H06	
	J10	J		0047		01			P3	H07	
	J10	K		0048		01			P3	H08	
	J10	L		0049		01			P3	H09	
	J10	M		0050		01			P3	H10	
	J10	N		0051		01			P3	H11	
	J10	P		0052		01			P3	H12	
	J10	R		0053		01			P3	H13	
	J10	V		0054		01			P3	D08	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CODE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J11	A		0055		01			P3	H14	
	J11	C		0056		01			P3	D05	
	J11	E		0057		01			P3	D06	
	J11	G		0058		01			P3	J07	
	J11	K		0059		01			P3	J08	
	J11	M		0060		01			P3	J09	
	J11	N		0061		01			P3	J10	
	J11	P		0062		01			P3	J11	
	J11	R		0063		01			P3	J12	
	J11	S		0064		01			P3	J13	
	J12	001		0094	W	01			P2	C08	
	J12	002		0094	B	02			P2	D01	
	J13	001		0095	W	01			P2	J13	
	J13	002		0095	B	02			P2	J12	
	J14	001		0126	W	01			P2	E07	
	J14	002		0126	B	02			P2	E12	
	J15	001		0127	W	01			P2	H14	
	J15	002		0127	B	02			P2	E14	
	J16	001		0158	W	01			P2	G06	
	J16	002		0158	B	02			P2	G11	
	J17	001		0159	W	01			P2	G07	
	J17	002		0159	B	02			P2	G13	
	J18	001		0244	W	01			P1	C08	
	J18	002		0244	B	02			P1	C13	
	J19	001		0245	W	01			P1	C09	
	J19	002		0245	B	02			P1	D01	
	J20	A		0195		01			P1	D02	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J20	B		0196		01			P1	D04	
	J20	C		0197		01			P1	D03	
	J20	D		0198		01			P1	F05	
	J20	E		0199		01			P1	F07	
	J20	F		0200		01			P1	F08	
	J20	G		0201		01			P1	G09	
	J20	H		0202		01			P1	D05	
	J20	J		0203		01			P1	D06	
	J20	K		0204		01			P1	D07	
	J20	L		0205		01			P1	D08	
	J20	M		0206		01			P1	G08	
	J20	N		0207		01			P1	G07	
	J20	P		0208		01			P1	D11	
	J20	R		0209		01			P1	D12	
	J20	S		0210		01			P1	D13	
	J20	T		0211		01			P1	D14	
	J20	U		0212		01			P1	D15	
	J20	V		0213		01			P1	D16	
	J20	W		0214		01			P1	D17	
	J20	X		0215		01			P1	D18	
	J20	Y		0216		01			P1	E01	
	J20	Z		0217		01			P1	E02	
	J20	*A		0218		01			P1	E03	
	J20	*B		0219		01			P1	E05	
	J20	*C		0220		01			P1	E06	
	J20	*D		0221		01			P1	E07	
	J20	*E		0222		01			P1	F11	
	J20	*F		0223		01			P1	F12	
	J20	*G		0224		01			P1	F13	
	J20	*H		0225		01			P1	F14	
	J20	*I		0226		01			P1	E12	
	J20	*J		0227		01			P1	F13	
	J20	*K		0228		01			P1	F14	
	J20	*M		0229		01			P1	E15	
	J20	*N		0230		01			P1	E16	
	J20	*P		0231		01			P1	E17	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J20	*Q		0232		01			P1	E18	
	J20	*R		0233		01			P1	F01	
	J20	*S		0234		01			P1	F02	
	J20	*T		0235		01			P1	F03	
	J21	A		0066		01			P2	A10	
	J21	B		0067		01			P2	A11	
	J21	C		0068		01			P2	A12	
	J21	D		0069		01			P2	A13	
	J21	E		0070		01			P2	A14	
	J21	F		0071		01			P2	B05	
	J21	G		0072		01			P2	C07	
	J21	H		0073		01			P2	B06	
	J21	J		0074		01			P2	A05	
	J21	K		0075		01			P2	B07	
	J21	L		0076		01			P2	C12	
	J21	M		0077		01			P2	B09	
	J21	N		0078		01			P2	B08	
	J21	P		0079		01			P2	B10	
	J21	S		0080		01			P2	B11	
	J21	U		0081		01			P2	C13	
	J21	W		0082		01			P2	B12	
	J21	X		0083		01			P2	B13	
	J21	Y		0084		01			P2	C10	
	J21	7		0085		01			P2	B14	
	J21	*A		0086		01			P2	A09	
	J21	*D		0087		01			P2	A08	
	J21	*F		0088		01			P2	A07	
	J21	*G		0089		01			P2	A06	
	J21	*H		0090		01			P2	C05	
	J21	*I		0091		01			P2	C06	
	J21	*J		0092		01			P2	C14	
	J21	*P		0093		01			P2	J11	
	J22	A		0098		01			P2	D07	
	J22	B		0099		01			P2	D08	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J22	C		0100		01			P2	H09	
	J22	D		0101		01			P2	H10	
	J22	F		0102		01			P2	D11	
	J22	F		0103		01			P2	D12	
	J22	G		0104		01			P2	E06	
	J22	H		0105		01			P2	D13	
	J22	J		0106		01			P2	D02	
	J22	K		0107		01			P2	D14	
	J22	L		0108		01			P2	H11	
	J22	M		0109		01			P2	D16	
	J22	N		0110		01			P2	D15	
	J22	P		0111		01			P2	C11	
	J22	S		0112		01			P2	D18	
	J22	U		0113		01			P2	H12	
	J22	W		0114		01			P2	E01	
	J22	X		0115		01			P2	E02	
	J22	Y		0116		01			P2	H13	
	J22	Z		0117		01			P2	E03	
	J22	*A		0118		01			P2	D06	
	J22	*D		0119		01			P2	D05	
	J22	*F		0120		01			P2	D04	
	J22	*G		0121		01			P2	D03	
	J22	*H		0122		01			P2	E04	
	J22	*I		0123		01			P2	E05	
	J22	*J		0124		01			P2	E13	
	J22	*P		0125		01			P2	G14	
	J23	A		0130		01			P2	F02	
	J23	B		0131		01			P2	F03	
	J23	C		0132		01			P2	F04	
	J23	D		0133		01			P2	F05	
	J23	E		0134		01			P2	F06	
	J23	F		0135		01			P2	F07	
	J23	G		0136		01			P2	G05	
	J23	H		0137		01			P2	F08	
	J23	J		0138		01			P2	E15	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J23	K		0139		01			P2	H05	
	J23	L		0140		01			P2	G10	
	J23	M		0141		01			P2	F11	
	J23	N		0142		01			P2	H06	
	J23	P		0143		01			P2	F12	
	J23	S		0144		01			P2	F13	
	J23	U		0145		01			P2	G09	
	J23	W		0146		01			P2	F14	
	J23	X		0147		01			P2	F15	
	J23	Y		0148		01			P2	G08	
	J23	Z		0149		01			P2	F16	
	J23	*A		0150		01			P2	F01	
	J23	*D		0151		01			P2	E18	
	J23	*F		0152		01			P2	E17	
	J23	*G		0153		01			P2	E16	
	J23	*H		0154		01			P2	F17	
	J23	*I		0155		01			P2	F18	
	J23	*J		0156		01			P2	G12	
	J23	*P		0157		01			P2	H07	
	J24	A		0168		01			P1	A10	
	J24	B		0169		01			P1	A11	
	J24	C		0170		01			P1	A12	
	J24	D		0171		01			P1	A13	
	J24	E		0172		01			P1	A14	
	J24	F		0173		01			P1	B05	
	J24	G		0174		01			P1	C07	
	J24	H		0175		01			P1	B06	
	J24	J		0176		01			P1	A05	
	J24	K		0177		01			P1	B07	
	J24	L		0178		01			P1	C12	
	J24	M		0179		01			P1	B09	
	J24	N		0180		01			P1	B08	
	J24	P		0181		01			P1	B10	
	J24	S		0182		01			P1	B11	
	J24	U		0183		01			P1	C11	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J24	W		0184		01			P1	B12	
	J24	X		0185		01			P1	B13	
	J24	Y		0186		01			P1	C10	
	J24	Z		0187		01			P1	B14	
	J24	*A		0188		01			P1	A09	
	J24	*D		0189		01			P1	A08	
	J24	*E		0240		01			P3	D12	
	J24	*F		0190		01			P1	A07	
	J24	*G		0191		01			P1	A06	
	J24	*H		0192		01			P1	C05	
	J24	*I		0193		01			P1	C06	
	J24	*J		0194		01			P1	C14	
	J24	*P		0241		01			P3	D14	
	J24	*Q		0242		01			P3	D13	
	J24	*R		0243		01			P3	D15	
	J25	A		0022		01			P3	F06	
	J25	B		0023		01			P3	F07	
	J25	C		0024		01			P3	F08	
	J25	D		0025		01			P3	E06	
	J25	E		0026		01			P3	E07	
	J25	F		0027		01			P3	F11	
	J25	G		0028		01			P3	F12	
	J25	H		0029		01			P3	F13	
	J25	J		0030		01			P3	F14	
	J25	K		0031		01			P3	F15	
	J25	L		0032		01			P3	F18	
	J25	M		0033		01			P3	F17	
	J25	N		0034		01			P3	G05	
	J25	P		0035		01			P3	F16	
	J25	Y		0296		01			P3	F04	
	J25	Z		0020		01			P3	F02	
	J25	*A		0036		01			P3	G06	
	J25	*B		0037		01			P3	G07	
	J25	*T		0021		01			P3	F03	
	J25	*T		0038		01			P3	G08	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	J26	001		0000		*			P3	A14	
	J26	002		1111		*			P3	A13	
	J26	003		2222		*			P3	A12	
	J26	004		3333		*			P3	A11	
	J26	005		4444		*			P3	A10	
	J26	006		5555		*			P3	A09	
	J26	007		6666		*			P3	B05	
	J26	008		7777		*			P3	A07	
	J26	009		8888		*			P3	A08	
	J26	010		9999		*			P3	B06	
	J26	011		9099		*			P3	A05	
	J26	012		9199		*			P3	A06	
	K1	A1		0248		01			J03	TIP	
	K1	A2		0249		01			J03	SLV	
	K1	A3		0250		01			J03	RNG	
	K1	B1		0251		01			J07	TIP	
	K1	B2		0252		01			J07	SLV	
	K1	B3		0253		01			J07	RNG	
	K1	X1		0254		01			TB1	A05	
	K1	X2		0065		01			P3	F05	
	K2	001		0257		15			J08	AC	
	K2	002		0266		15			S1	D	
	K2	003		0258		15			J08	AC	
	K2	004		0265		15			PS1TL	004	
	PS1	001		0286		15			TB1	A01	
	PS1	002		0255		*			A4	POS	
	PS1	002		0287		15			TB1	A02	
	PS1	003		0256		*			A4	NEG	
	PS1	003		0288		15			TB1	A03	
	PS1	004		0289		15			TB1	A03	
	PS1	005		0290		15			TB1	A05	
	PS1	006		0291		15			TB1	A06	
	PS1	007		0294		15			TB1	A04	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	PS1	008		0295		15			TB1	A04	
	PS1	009		0292		15			TB1	A07	
	PS1	010		0293		15			TB1	A08	
	PS1T1	001		0260		15			J08	ACC	
	PS1T1	002		0263		15			J08	E	
	PS1T1	003		0262		15			J08	D	
	PS1T1	004		0264		15			J08	F	
	PS1T1	004		0265		15			K2	004	
	P1	A05		0176		01	03		J24	J	
	P1	A06		0191		01	03		J24	*G	
	P1	A07		0190		01	03		J24	*F	
	P1	A08		0189		01	03		J24	*D	
	P1	A09		0188		01	03		J24	*A	
	P1	A10		0168		01	03		J24	A	
	P1	A11		0169		01	03		J24	B	
	P1	A12		0170		01	03		J24	C	
	P1	A13		0171		01	03		J24	D	
	P1	A14		0172		01	03		J24	E	
	P1	B05		0173		01	03		J24	F	
	P1	B06		0175		01	03		J24	H	
	P1	B07		0177		01	03		J24	K	
	P1	B08		0180		01	03		J24	N	
	P1	B09		0179		01	03		J24	M	
	P1	B10		0181		01	03		J24	P	
	P1	B11		0182		01	03		J24	S	
	P1	B12		0184		01	03		J24	W	
	P1	B13		0185		01	03		J24	X	
	P1	B14		0187		01	03		J24	Z	
	P1	C05		0192		01	03		J24	*H	
	P1	C06		0193		01	03		J24	*I	
	P1	C07		0174		01	03		J24	G	
	P1	C08		0244	W	01	03		J18	001	
	P1	C09		0245	W	01	03		J19	001	
	P1	C10		0186		01	03		J24	Y	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P1	C11		0183		01	03		J24	U	
	P1	C12		0178		01	03		J24	L	
	P1	C13		0244	B	02	03		J18	002	
	P1	C14		0194		01	03		J24	*J	
	P1	D01		0245	B	02	03		J19	002	
	P1	D02		0195		01	03		J20	A	
	P1	D03		0197		01	03		J20	C	
	P1	D04		0196		01	03		J20	B	
	P1	D05		0202		01	03		J20	H	
	P1	D06		0203		01	03		J20	J	
	P1	D07		0204		01	03		J20	K	
	P1	D08		0205		01	03		J20	L	
	P1	D11		0208		01	03		J20	P	
	P1	D12		0209		01	03		J20	R	
	P1	D13		0210		01	03		J20	S	
	P1	D14		0211		01	03		J20	T	
	P1	D15		0212		01	03		J20	U	
	P1	D16		0213		01	03		J20	V	
	P1	D17		0214		01	03		J20	W	
	P1	D18		0215		01	03		J20	X	
	P1	E01		0216		01	03		J20	Y	
	P1	E02		0217		01	03		J20	Z	
	P1	E03		0218		01	03		J20	*A	
	P1	E05		0219		01	03		J20	*B	
	P1	E06		0220		01	03		J20	*C	
	P1	E07		0221		01	03		J20	*D	
	P1	E12		0226		01	03		J20	*I	
	P1	E13		0227		01	03		J20	*J	
	P1	E14		0228		01	03		J20	*K	
	P1	E15		0229		01	03		J20	*M	
	P1	E16		0230		01	03		J20	*N	
	P1	E17		0231		01	03		J20	*P	
	P1	E18		0232		01	03		J20	*Q	
	P1	F01		0233		01	03		J20	*R	
	P1	F02		0234		01	03		J20	*S	
	P1	F03		0235		01	03		J20	*T	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P1	F04		0236	W	01	03		J06	001	
	P1	F05		0198		01	03		J20	D	
	P1	F06		0237	W	01	03		J04	001	
	P1	F07		0199		01	03		J20	E	
	P1	F08		0200		01	03		J20	F	
	P1	F11		0222		01	03		J20	*E	
	P1	F12		0223		01	03		J20	*F	
	P1	F13		0224		01	03		J20	*G	
	P1	F14		0225		01	03		J20	*H	
	P1	F18		0285		16	03		TB1	B08	
	P1	G05		0236	B	02	03		J06	002	
	P1	G06		0237	B	02	03		J04	002	
	P1	G07		0207		01	03		J20	N	
	P1	G08		0206		01	03		J20	M	
	P1	G09		0201		01	03		J20	G	
	P1	G10		0280		16	03		TB1	B06	
	P1	G11		0281		16	03		TB1	B06	
	P1	G12		0282		16	03		TB1	B07	
	P1	G13		0283		16	03		TB1	B07	
	P1	G14		0284		16	03		TB1	B08	
	P1	H05		0270		16	03		TB1	B03	
	P1	H06		0271		16	03		TB1	B03	
	P1	H07		0272		16	03		TB1	B04	
	P1	H08		0273		16	03		TB1	B04	
	P1	H09		0274		16	03		TB1	B01	
	P1	H10		0275		16	03		TB1	B01	
	P1	H11		0276		16	03		TB1	B02	
	P1	H12		0277		16	03		TB1	B02	
	P1	H13		0278		16	03		TB1	B05	
	P1	H14		0279		16	03		TB1	B05	
	P1	J05		0160	W	01	03		J01	001	
	P1	J06		0160	B	02	03		J01	002	
	P1	J07		0161	W	01	03		J02	001	
	P1	J08		0161	B	02	03		J02	002	
	P1	J09		0162	W	01	03		J05	001	
	P1	J10		0162	B	02	03		J05	002	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P2	A05		0074		01	03		J21	J	
	P2	A06		0089		01	03		J21	*G	
	P2	A07		0088		01	03		J21	*F	
	P2	A08		0087		01	03		J21	*D	
	P2	A09		0086		01	03		J21	*A	
	P2	A10		0066		01	03		J21	A	
	P2	A11		0067		01	03		J21	B	
	P2	A12		0068		01	03		J21	C	
	P2	A13		0069		01	03		J21	D	
	P2	A14		0070		01	03		J21	E	
	P2	B05		0071		01	03		J21	F	
	P2	B06		0073		01	03		J21	H	
	P2	B07		0075		01	03		J21	K	
	P2	B08		0078		01	03		J21	N	
	P2	B09		0077		01	03		J21	M	
	P2	B10		0079		01	03		J21	P	
	P2	B11		0080		01	03		J21	S	
	P2	B12		0082		01	03		J21	W	
	P2	B13		0083		01	03		J21	X	
	P2	B14		0085		01	03		J21	Z	
	P2	C05		0090		01	03		J21	*H	
	P2	C06		0091		01	03		J21	*I	
	P2	C07		0072		01	03		J21	G	
	P2	C08		0094	W	01	03		J12	001	
	P2	C10		0084		01	03		J21	Y	
	P2	C11		0111		01	03		J22	P	
	P2	C12		0076		01	03		J21	L	
	P2	C13		0081		01	03		J21	U	
	P2	C14		0092		01	03		J21	*J	
	P2	D01		0094	B	02	03		J12	002	
	P2	D02		0106		01	03		J22	J	
	P2	D03		0121		01	03		J22	*G	
	P2	D04		0120		01	03		J22	*F	
	P2	D05		0119		01	03		J22	*D	
	P2	D06		0118		01	03		J22	*A	
	P2	D07		0098		01	03		J22	A	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P2	D08		0099		01	03		J22	B	
	P2	D11		0102		01	03		J22	E	
	P2	D12		0103		01	03		J22	F	
	P2	D13		0105		01	03		J22	H	
	P2	D14		0107		01	03		J22	K	
	P2	D15		0110		01	03		J22	N	
	P2	D16		0109		01	03		J22	M	
	P2	D18		0112		01	03		J22	S	
	P2	E01		0114		01	03		J22	W	
	P2	E02		0115		01	03		J22	X	
	P2	E03		0117		01	03		J22	Z	
	P2	E04		0122		01	03		J22	*H	
	P2	E05		0123		01	03		J22	*I	
	P2	E06		0104		01	03		J22	G	
	P2	E07		0126	W	01	03		J14	001	
	P2	E12		0126	B	02	03		J14	002	
	P2	E13		0124		01	03		J22	*J	
	P2	E14		0127	B	02	03		J15	002	
	P2	E15		0138		01	03		J23	J	
	P2	E16		0153		01	03		J23	*G	
	P2	E17		0152		01	03		J23	*F	
	P2	E18		0151		01	03		J23	*D	
	P2	F01		0150		01	03		J23	*A	
	P2	F02		0130		01	03		J23	A	
	P2	F03		0131		01	03		J23	B	
	P2	F04		0132		01	03		J23	C	
	P2	F05		0133		01	03		J23	D	
	P2	F06		0134		01	03		J23	E	
	P2	F07		0135		01	03		J23	F	
	P2	F08		0137		01	03		J23	H	
	P2	F11		0141		01	03		J23	M	
	P2	F12		0143		01	03		J23	P	
	P2	F13		0144		01	03		J23	S	
	P2	F14		0146		01	03		J23	W	
	P2	F15		0147		01	03		J23	X	
	P2	F16		0149		01	03		J23	Z	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P2	F17		0154		01	03		J23	*H	
	P2	F18		0155		01	03		J23	*I	
	P2	G05		0136		01	03		J23	G	
	P2	G06		0158	W	01	03		J16	001	
	P2	G07		0159	W	01	03		J17	001	
	P2	G08		0148		01	03		J23	Y	
	P2	G09		0145		01	03		J23	U	
	P2	G10		0140		01	03		J23	L	
	P2	G11		0158	B	02	03		J16	002	
	P2	G12		0156		01	03		J23	*J	
	P2	G13		0159	B	02	03		J17	002	
	P2	G14		0125		01	03		J22	*P	
	P2	H05		0139		01	03		J23	K	
	P2	H06		0142		01	03		J23	N	
	P2	H07		0157		01	03		J23	*P	
	P2	H09		0100		01	03		J22	C	
	P2	H10		0101		01	03		J22	D	
	P2	H11		0108		01	03		J22	L	
	P2	H12		0113		01	03		J22	U	
	P2	H13		0116		01	03		J22	Y	
	P2	H14		0127	W	01	03		J15	001	
	P2	J11		0093		01	03		J21	*P	
	P2	J12		0095	B	02	03		J13	002	
	P2	J13		0095	W	01	03		J13	001	
	P3	A05		9099		*	03		J26	011	
	P3	A06		9199		*	03		J26	012	
	P3	A07		7777		*	03		J26	008	
	P3	A08		8888		*	03		J26	009	
	P3	A09		5555		*	03		J26	006	
	P3	A10		4444		*	03		J26	005	
	P3	A11		3333		*	03		J26	004	
	P3	A12		2222		*	03		J26	003	
	P3	A13		1111		*	03		J26	002	
	P3	A14		0000		*	03		J26	001	
	P3	B05		6666		*	03		J26	007	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P3	B06		9999		*	03		J26	010	
	P3	B07		0001		01	03		J09	A	
	P3	B08		0002		01	03		J09	B	
	P3	B09		0003		01	03		J09	C	
	P3	B10		0004		01	03		J09	D	
	P3	B11		0005		01	03		J09	E	
	P3	B12		0006		01	03		J09	F	
	P3	B13		0007		01	03		J09	G	
	P3	B14		0008		01	03		J09	H	
	P3	C05		0011		01	03		J09	L	
	P3	C06		0016		01	03		J09	S	
	P3	C07		0015		01	03		J09	R	
	P3	C08		0009		01	03		J09	J	
	P3	C09		0010		01	03		J09	K	
	P3	C10		0014		01	03		J09	P	
	P3	C11		0013		01	03		J09	N	
	P3	C12		0012		01	03		J09	M	
	P3	C13		0017		01	03		J09	T	
	P3	C14		0018		01	03		J09	U	
	P3	D01		0019		01	03		J09	V	
	P3	D05		0056		01	03		J11	C	
	P3	D06		0057		01	03		J11	E	
	P3	D08		0054		01	03		J10	V	
	P3	D12		0240		01	03		J24	*E	
	P3	D13		0242		01	03		J24	*Q	
	P3	D14		0241		01	03		J24	*P	
	P3	D15		0243		01	03		J24	*R	
	P3	E06		0025		01	03		J25	D	
	P3	E07		0026		01	03		J25	E	
	P3	F02		0020		01	03		J25	Z	
	P3	F03		0021		01	03		J25	*T	
	P3	F04		0296		01	03		J25	Y	
	P3	F05		0065		01	03		K1	X2	
	P3	F06		0022		01	03		J25	A	
	P3	F07		0023		01	03		J25	B	
	P3	F08		0024		01	03		J25	C	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	P3	F11		0027		01	03		J25	F	
	P3	F12		0028		01	03		J25	G	
	P3	F13		0029		01	03		J25	H	
	P3	F14		0030		01	03		J25	J	
	P3	F15		0031		01	03		J25	K	
	P3	F16		0035		01	03		J25	P	
	P3	F17		0033		01	03		J25	M	
	P3	F18		0032		01	03		J25	L	
	P3	G05		0034		01	03		J25	N	
	P3	G06		0036		01	03		J25	*A	
	P3	G07		0037		01	03		J25	*B	
	P3	G08		0038		01	03		J25	*T	
	P3	G09		0039		01	03		J10	A	
	P3	G10		0040		01	03		J10	B	
	P3	G11		0041		01	03		J10	C	
	P3	G12		0042		01	03		J10	D	
	P3	G13		0043		01	03		J10	E	
	P3	G14		0044		01	03		J10	F	
	P3	H05		0045		01	03		J10	G	
	P3	H06		0046		01	03		J10	H	
	P3	H07		0047		01	03		J10	J	
	P3	H08		0048		01	03		J10	K	
	P3	H09		0049		01	03		J10	L	
	P3	H10		0050		01	03		J10	M	
	P3	H11		0051		01	03		J10	N	
	P3	H12		0052		01	03		J10	P	
	P3	H13		0053		01	03		J10	R	
	P3	H14		0055		01	03		J11	A	
	P3	J07		0058		01	03		J11	G	
	P3	J08		0059		01	03		J11	K	
	P3	J09		0060		01	03		J11	M	
	P3	J10		0061		01	03		J11	N	
	P3	J11		0062		01	03		J11	P	
	P3	J12		0063		01	03		J11	R	
	P3	J13		0064		01	03		J11	S	

FROM SHLD	FROM COMPONENT	PIN	CD	WIRE NO.	CLR CDE	ITEM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
	S1	A		0261		15			J08	C	
	S1	D		0266		15			K2	002	
	S1	X	)	0269		16			S1	7	
	S1	Y		0268		16			TB1	A03	
	S1	7		0267		16			TB1	A02	
	S1	7	)	0269		16			S1	X	
	TB1	A01		0286		15	18		PS1	001	
	TB1	A02		0267		16	18		S1	Z	
	TB1	A02		0287		15	18		PS1	002	
	TB1	A03		0268		16	18		S1	Y	
	TB1	A03		0288		15	18		PS1	003	
	TB1	A03		0289		15	18		PS1	004	
	TB1	A04		0294		15	18		PS1	007	
	TB1	A04		0295		15	18		PS1	008	
	TB1	A05		0254		01	17		K1	X1	
	TB1	A05		0290		15	18		PS1	005	
	TB1	A06		0291		15	18		PS1	006	
	TB1	A07		0292		15	18		PS1	009	
	TB1	A08		0293		15	18		PS1	010	
	TB1	B01		0274		16	18		P1	H09	
	TB1	B01		0275		16	18		P1	H10	
	TB1	B02		0276		16	18		P1	H11	
	TB1	B02		0277		16	18		P1	H12	
	TB1	B03		0270		16	18		P1	H05	
	TB1	B03		0271		16	18		P1	H06	
	TB1	B04		0272		16	18		P1	H07	
	TB1	B04		0273		16	18		P1	H08	
	TB1	B05		0278		16	18		P1	H13	
	TB1	B05		0279		16	18		P1	H14	
	TB1	B06		0280		16	18		P1	G10	
	TB1	B06		0281		16	18		P1	G11	
	TB1	B07		0282		16	18		P1	G12	
	TB1	B07		0283		16	18		P1	G13	
	TB1	B08		0284		16	18		P1	G14	
	TB1	B08		0285		16	18		P1	F18	

X. REFERENCES

OPERATOR'S HANDBOOK

CP7

L 191 000 650

SINGER LIBRASCOPE DIVISION			
DRAWN SEE PAGE 1	SIZE A	FSCM NO. 36090	DWG NO. L 200 024 705
ISSUED SEE PAGE 1	SCALE		SHEET 40 0f 40

2441-2 7/77

LIBRA NO.

ENGINEERING ORDER (SEPARATE PARTS LIST) ☒ NOTICE OF REVISION ☐

SINGER LIBRASCOPE DIVISION CODE IDENT 36090

NOR/CHANGE NO. _____ SHEET 1 OF 3

Drawing Title: COMPUTER PROGRAMMER MODEL CP-7	Customer No. —	Librascope No. L200 024 705	Revision 1
	PL —	PL200 024705	
Next Assembly ☐ Multi-Use	Customer No. of N/A —	Libra. No. of N/A —	Class Chg II
Serialized Item Nomenclature	Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor Ew
End Item Nomenclature CP-7 ☐ Multi-Use	Cust. No. of End Item —	Libra. No. of End Item —	11-14 77

Reason for Revision: TO ADD & DELETE PARTS

Change Requested on Contract: N/A

Change Order —

Drawing Change

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
11-9-77	11-9-77	11-9-77	11-9-77	*

Change Board	Date
Chair.	Eng.
C.M.	Mfg.
	Q.C.

RFI No. — DCR No. —

ECP No. — D/W No. —

AFFECTED	YES	NO
Master Layout		✓
Eng. Spec. (ES)		✓
Test Equipment		✓
P.O. Change Req'd.		✓

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is				
Rework	✓	✓	✓	✓
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A

Concurrence of Class ☐

Immediate Compliance	✓
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg. 001 & SUBS

Serial Req. Backfit

Serials in Compliance

Mfg. Job No. Affected A8-401

DESCRIPTION OF CHANGE

PARTS LIST:

ITEM 29 QTY IS: 15 S/B: 25

ITEM 40 PART NO. IS: 3184905

S/B: L360 000 110; 1828291

ITEM 58 IS: H795 160 624; MS51957-36; 1.50 LG

S/B: H795 160 620; MS51957-35; 1.25 LG

ITEM 59 IS: H795 160 808; MS51957-45; .50 LG

S/B: H795 160 807; MS51957-44; .44 LG

ADD ITEM 71; 2; H599 160 801; 1287424-6; NUT SLF-LKG, HEX, .164-32

ITEM 74: IS: B COND S/B: 3 COND

ADD ITEM 25; 2; L217 000 033; BUS BAR

ENGINEERING ORDER NOTICE OF REVISION

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

SHEET 2

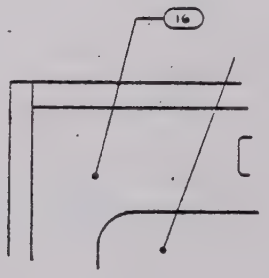
Drawing Title	Customer No.	Librascope No.	Revision
COMPUTER PROGRAMMER MODEL CP-7	—	L200024705	1

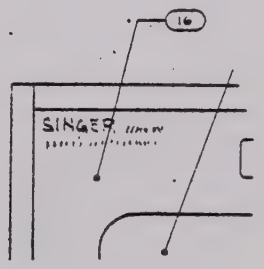
ADD BUS BAR INSTALLATION CHART TO F/D:

BUS BAR INSTALLATION CHART

STARING CONN & PIN NO.	TERMINATING CONN & PIN NO.	BUS BAR ITEM NO.
XA1-A	XA11-1	25
XA1-Z	XA11-22	25

SH 1, ZONE 4 D ADD:





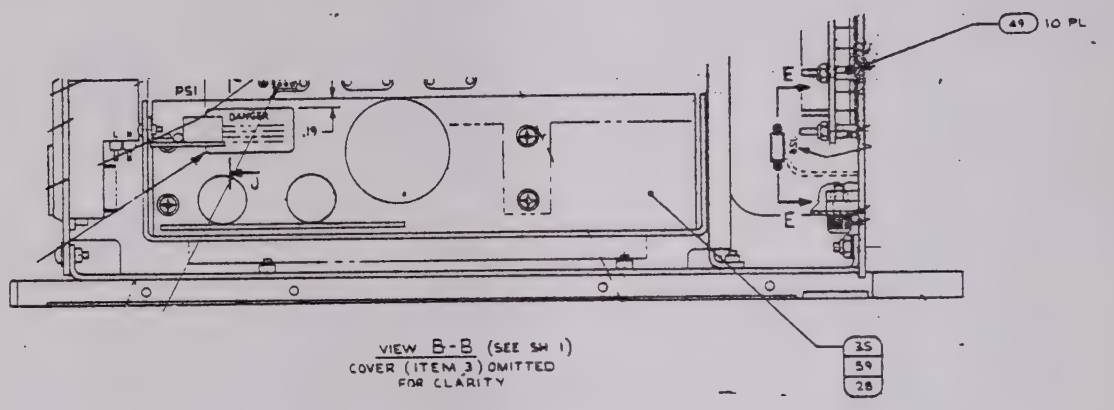
3125-7 9/75

3126-4 8/74

ENGINEERING ORDER | NOTICE OF REVISION | SINGER LIBRASCOPE DIVISION CODE IDENT 36090 | SHEET 3

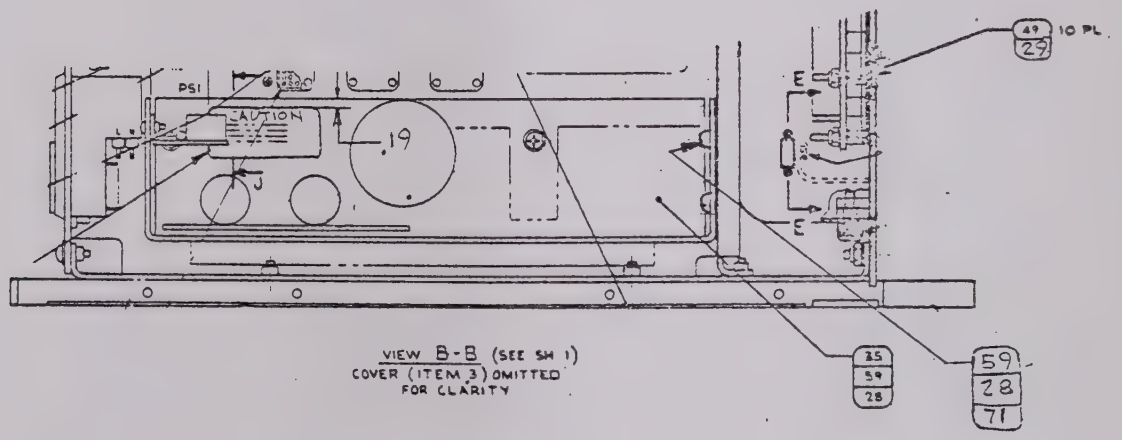
Drawing Title	Customer No.	Librascope No.	Revision
COMPUTER PROGRAMMER MODEL CP-7	—	L200024705	1

SH 2 ZONE 2C THRU 5 C



VIEW B-B (SEE SH 1)
COVER (ITEM 3) OMITTED FOR CLARITY

1S:



VIEW B-B (SEE SH 1)
COVER (ITEM 3) OMITTED FOR CLARITY

S/B:

PARTS LIST	SINGER	LIBRASCOPE GLENDALE, CA. 91201	DATE PREPARED 9/19/77	PL 200024705	REV
LIST TITLE	COMPUTER PROGRAMMER MODEL CP-7		REV AUTH NO.	CODE IDENT 36090	SH 1 OF 6
APPROVAL D. Carlson	DATE 10/12/77	CONTRACT NO.			

REV	REVISION DESCRIPTION	REV DATE	APPD	REV	REVISION DESCRIPTION	REV DATE	APPD
Rev 1							

RECORD OF REVISION STATUS OF EACH SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

PARTS LIST	SINGER	LIBRASCOPE GLENDALE, CA. 91201	CODE IDENT 36090	PL L200024705	REVISION	SH NO. 2

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPE NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	SYM	LINE NO.
								1
1	1			T300015501		SIDE PLATE ASSY (RIGHT)		2
								3
2	1			T300015502		SIDE PLATE ASSY (LEFT)		4
								5
3	1			T315006901		COVER ASSEMBLY (TOP)		6
								7
4	1			T315006902		COVER ASSEMBLY (BOTTOM)		8
								9
5	1			L200024683		KEYBOARD-COVER ASSY		10
								11
6	1			L300005015		PLATE ASSY, SOCKET MTG		12
								13
7	1			L535300616		CIRCUIT CARD ASSY-DISPLAY DRIVER	A1	14
								15
8	1			L535300615		CIRCUIT CARD ASSY-INTERFACE MOD	A2	16
								17
9	4			L535300598		CIRCUIT CARD ASSY-EMI METER CONTROLLER	A3-A6	18 19 20
10	1			L535300597		CIRCUIT CARD ASSY-AUXILIARY CONTROLLER	A7	21 22 23
11	1			L535300596		CIRCUIT CARD ASSY-ANALOG OUTPUT MOD	A8	24 25 26
12	1			L535300595		CIRCUIT CARD ASSY-DATA ACQUISITION MOD	A9	27 28 29
13	1			L535300594		CIRCUIT CARD ASSY-PROM MOD	A10	30 31
14	1			L535300593		CIRCUIT CARD ASSY-MICRO-PROCESSOR I/O MOD	A11	32 33 34
15	1			L330003307		BRACKET, BASE		35 36
16	1			L523001866		PANEL, KEYBOARD		37 38 39 40 41

PARTS LIST	SINGER	LIBRASCOPE GLENDALE, CA. 91201	CODE IDENT 36090	PL 200024705	REVISION	SH NO. 3

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPE NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	SYM	LINE NO.
								1
17				L536000352		COMPONENT, BOARD ASSY		2
								3
18	1			L330003299		BRACKET, RIGHT SIDE		4
								5
19	1			L330003309		BRACKET, LEFT SIDE		6
								7
20	1			L330003308		BRACKET		8
								9
21	1			L300005010		PLATE, CONNECTOR MTG		10
								11
22	11			L520011338		CONNECTOR, WIRE WRAP	XA1-XA11	12
								13
								14
23								15
								16
24	3				3184850	CONNECTOR, RECEPTACLE 106 PIN, WIRE WRAP	A1J1, A1J2 A1J3	17
								18
25								19
								20
26	16			L312000327	706125-27	WASHER, SHIM NO. 10 (REDUCED O.D.)		21
								22
27	4			H955161003	AN960C10L	WASHER, FLAT #10		23
								24
28	48			H955160804	AN960C8	WASHER, FLAT #8		25
								26
29	15			H955160603	AN960C6L	WASHER, FLAT #6		27
								28
30	112			H955160403	AN960C4L	WASHER, FLAT #4		29
								30
31	1			L507002863		SWITCH, PUSH	S1	31
								32
32	1			L200024684		BUTTON ASSY, POWER SWITCH		33
								34
33	1			L503001009		RELAY, ARMATURE 2 PDT	K1	35
								36
34	1			L503001012		RELAY, SOLID STATE (LED OPTICAL ISOLATION)	K2	37
								38
								39
								40
								41

PARTS LIST	SINGER LIBRASCOPE GLENDALE, CA. 91201	CODE IDENT 36090	PL 200024705	REVISION	SH NO. 4

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPE NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	SYM	LINE NO.
								1
35	1			L501000292		POWER SUPPLY	PS1	2
								3
36	1			L414000147		OVERVOLTAGE PROTECTION MOD	A12	4
								5
37	1			L540002763	8TB10	TERMINAL BOARD MIL-T-55164	TB1	6
								7
38	11			L200024707		POLARIZING KEY		8
								9
39	1			L360006649		DECAL, FUSE & VOLTAGE		10
								11
40	1				3184905	PLATE, INSTRUCTION		12
								13
41	2			L320004397		SCREW, SHOULDER		14
								15
42	1			L360006648		PLATE, IDENTIFICATION		16
								17
43								18
								19
44	2			L336001864		CLAMP. LOOP		20
								21
45		AR		L312000319/327	706125-19/27	WASHER, SHIM		22
								23
46	2			L336008027	MS3367-1-9	STRAP, CABLE ADJ. SELF-LKG #1		24
								25
47		AR		L502000526	MS21266-2	GROMMET, CATERPILLAR		26
								27
48		AR		L101000176	ECCO BOND #51	ADHESIVE, EPOXY RESIN		28
								29
49	10			L301001185	1240089-15	POST, SPACER (.469 LG)		30
								31
50	4			L301001186	1240089-16	POST, SPACER (.500 LG)		32
								33
51	1			L317000146		WINDOW, EMI		34
								35
52	1			L505800758	F02B125V2AS	FUSE, (TIME LAG) 125V, 2A		36
								37
53	1			L505800756	F02B250V1AS	FUSE, (TIME LAG) 250V, 1A		38
								39
								40
								41

PARTS LIST	SINGER	LIBRASCOPE GLENDALE, CA. 91201	CODE IDENT 36090	PL 200024705	REVISION	SH NO. 5

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPE NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	LINE NO.
							1
							2
54							3
55		AR		L101000822	3179329	ADHESIVE SEALANT CONDUCTIVE	4
							5
56	48			H795160408	MS51957-17	SCREW, PANHD .112-40X 1/2LG	6
							7
57	22			H793160406	NAS1635-04LE6	SCREW, PANHD SLF-LKG .112-40 X .375 LG	8
							9
58	1			H795160624	MS51957-36	SCREW, PANHD .138-32X 1.50LG	10
							11
59	30			H795160808	MS51957-45	SCREW, PAN HD .164-32X .50LG	12
							13
60	16			H669160812	1486137-62	SCREW, CAP HEX SLF-LKG .164-32X.75LG	14
							15
61	16			H670161008	1486136-87	SCREW, CAP, HEX, SOC HD SLF-LKG .190-32X .50LG	16
							17
							18
62		REF		H771160406	NAS1189E04P6	SCREW, MACH,FL HD,100 .112-40X .38LG	19
							20
							21
63	2			H795160810	MS51957-46	SCREW, PAN HD .164-32X.62LG	22
							23
64	4			H795160406	MS51957-15	SCREW, PAN HD .112-40X.38LG	24
							25
65							26
							27
66							28
							29
67							30
							31
68	4			H550161001	1287425-7	NUT, SLF-LKG HEX .190-32	32
							33
69	15			H549160601	1287424-5	NUT, SLF-LGK HEX .138-32	34
							35
70	50			H549160401	1287424-3	NUT, SLF-LKG HEX .112-40	36
							37
71							38
							39
72	1			L544000165		WIRING DATA, CARD RACK CP7	40
							41

PARTS LIST	SINGER	LIBRASCOPE GLENDALE, CA. 91201	CODE IDENT 36090	PL 200024705	REVISION	SH NO. 6

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPE NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION SYM	LINE NO.
							1
73	1			L541003466		WIRING HARNESS	2
							3
74	1			L542001613		CABLE, LINE, B COND (SEE NOTE 6)	4
							5
							6
							7
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NOTES:

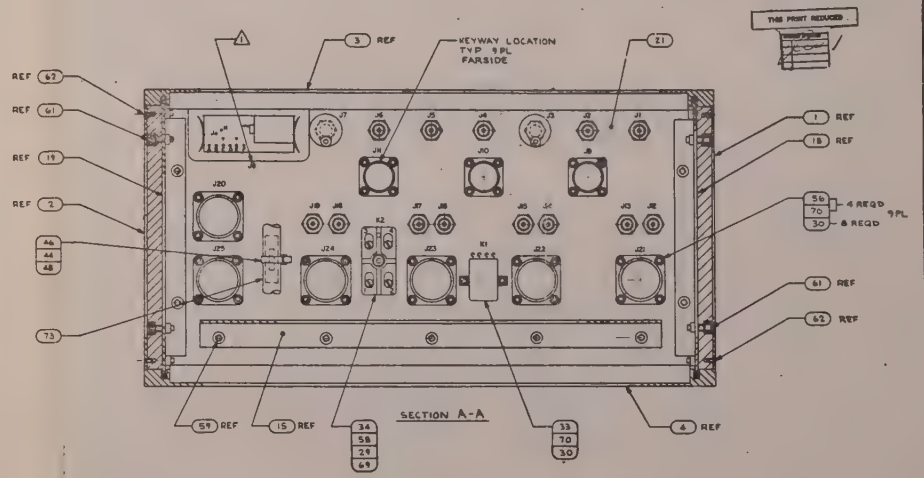
1. MARK REFERENCE DESIGNATIONS APPROX WHERE SHOWN IAW MIL-STD-130
2. SHIM FROM BOTH SIDES AS REQD TO ACHIEVE EQUAL GAP BETWEEN ITEMS 5 & 16
3. APPLY ADHESIVE (ITEM 55) TO FLANGE AREA OF EMI WINDOW (ITEM 81) BEFORE ASSY
4. REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH UNIT NO., ASSY DESIGNATION OR BOTH.
5. MOUNTING HARDWARE SUPPLIED WITH ITEM 74 IS A LOOSE PIECE ITEM TO BE SHIPPED WITH ASSEMBLY.
6. ITEM 74 IS A LOOSE PIECE ITEM TO BE SHIPPED WITH ASSEMBLY.

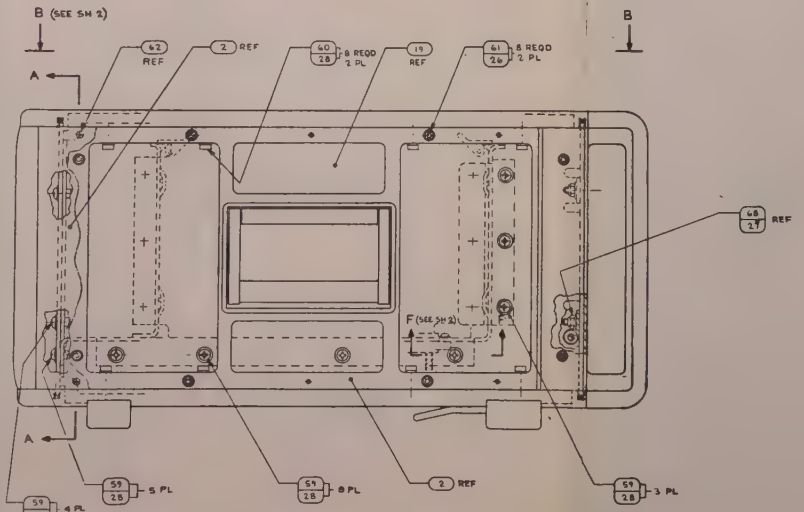
KEYING CHART

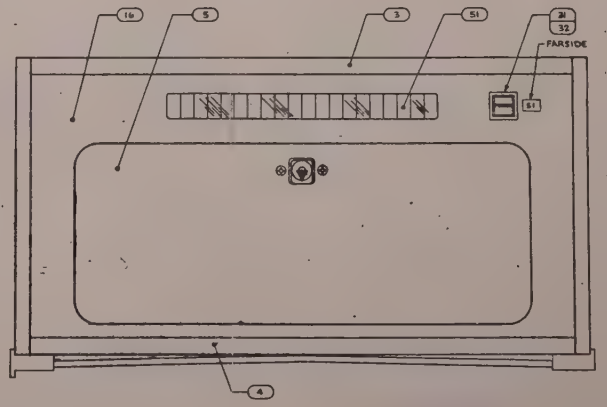
ITEM NO.	BETWEEN CONTACTS	CONNECTOR REF DES	KEY ITEM NO.	QTY
7	17-18	XA1	38	1
8	16-17	XA2		1
9	15-16	XA3, XA4, XA5, XA6		4
10	14-15	XA7		1
11	13-14	XA8		1
12	2-13	XA9		1
13	11-12	XA10		1
14	10-11	XA11	38	1

REFERENCE DWGS:

ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 005 300
OUTLINE & INSTALLATION
DWG NO. L547 000 182
FACTORY ACCEPTANCE TEST
DWG NO. L192 000 122



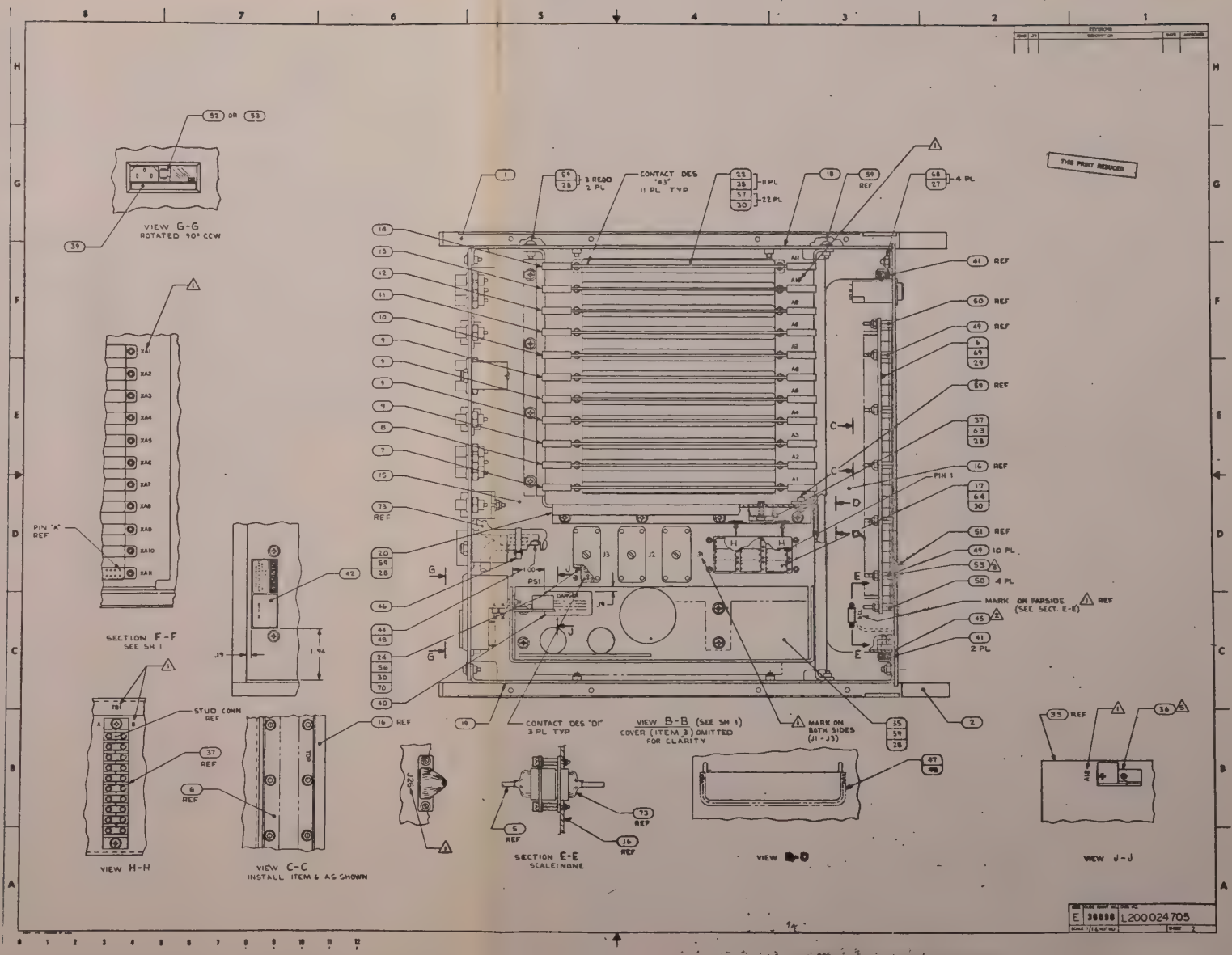




SEE SEPARATE PARTS LIST

SHEET 2
SHEET 1
REVISION STATUS OF SHEETS

SINGER GLENDALE, CA. 91201
COMPUTER PROGRAMMER MODEL CP-7
SIZE E 38000
DWG NO. L200024705
SHEET 1 OF 2


VIEW G-G
ROTATED 90° CCW
SECTION F-F
SEE SH 1
VIEW H-H
VIEW C-C
INSTALL ITEM 6 AS SHOWN
SECTION E-E
SCALE: NONE
VIEW B-B (SEE SH 1)
COVER (ITEM 3) OMITTED
FOR CLARITY
VIEW D-D
VIEW J-J
CONTACT DES "43"
11 PL TYP
CONTACT DES "01"
3 PL TYP
MARK ON FARSIDE
(SEE SECT. E-E)
THIS PRINT REDUCED
E 30000 L200024705

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSEMBLY PROM MODULE	Customer No.: —	Librascope No.: L535300594	Revision: 2
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 ☐ Multi-Use	Customer No. of N/A: —	Libra. No. of N/A: L200024705	Class Chg: II
Serialized Item Nomenclature	Cust. No. of Ser. Item: —	Libra. No. of Ser. Item: —	Rel Coor: gw
End Item Nomenclature: CP7 ☐ Multi-Use	Cust. No. of End Item: —	Libra. No. of End Item: —	9.21.77

Reason for Revision: UPDATE DWG

Change Requested on Contract: N/A

Change Order: ☐ Drawing Change: ☒

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. Allison 19SEPT77	—	M. Allison 21SEPT77	*	*

Change Board: Chair. — Eng. — Qtc. — C.M. — Mfg. —

RFI No. — DCR No. —

ECP No. — D/W No. —

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval: N/A

Concurrence of Class ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.

Serial Req. Backfit

Serials in Compliance

Mfg. Job No. Affected: A8-401

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT
WAS: "A" SIZE 4 SHTS

INCORP ED REV 1

3125-7 9/75

ENGINEERING ORDER [X] (SEPARATE PARTS LIST) NOTICE OF REVISION [ ] SINGER LIBRASCOPE DIVISION CODE IDENT 36090 NOR/CHANGE NO. ____ SHEET / OF 3

Drawing Title: COMPUTER PROGRAMMER MODEL CP-7	Customer No. ____	Librascope No. L200 024 705	Revision 1
	PL ____	PL200024705	
Next Assembly ☐ Multi-Use	Customer No. of N/A ____	Libra. No. of N/A ____	Class Chg II
Serialized Item Nomenclature	Cust. No. of Ser. Item ____	Libra. No. of Ser. Item ____	Rel Coor BW
End Item Nomenclature: CP-7 ☐ Multi-Use	Cust. No. of End Item ____	Libra. No. of End Item ____	11-14-77
Reason for Revision: TO ADD & DELETE PARTS	Change Requested on Contract N/A	Change Order ____ / Drawing Change ____	

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
11-9-77 Anderson	11-9-77 Anderson	11-9-77 Anderson	11-9-77 Anderson	*

Change Board	Date
Chair.	Eng.
C.M.	Mfg.
	Q.C.

RFI No. ____ DCR No. ____ ECP No. ____ D/W No. ____

AFFECTED	YES	NO
Master Layout		✓
Eng. Spec. (ES)		✓
Test Equipment		✓
P.O. Change Req'd.		✓

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is				
Rework	✓	✓	✓	✓
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A — Concurrence of Class ☐

Immediate Compliance	✓
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM
Effective Serial in Mfg. 001 & SUBS
Serial Req. Backfit
Serials in Compliance
Mfg. Job No. Affected A8-401

DESCRIPTION OF CHANGE

PARTS LIST:

ITEM 29 QTY IS: 15 S/B: 25

ITEM 40 PART NO. IS: 3184905

S/B: L360 000 110; 1828291

ITEM 58 IS: H795 160 624; MS51957-36; 1.50 LG

S/B: H795 160 620; MS51957-35; 1.25 LG

ITEM 59 IS: H795 160 808; MS51957-45; .50 LG

S/B: H795 160 807; MS51957-44; .44 LG

ADD ITEM 71; 2; H599 160 801; 1287424-6; NUT SLF-LKG, HEX, .164-32

ITEM 74: IS: B COND S/B: 3 COND

ADD ITEM 25; 2; L217 000 033; BUS BAR

135 4-77

ENGINEERING ORDER | NOTICE OF REVISION | SINGER, LIBRASCOPE DIVISION, CODE IDENT 36090 | SHEET 2

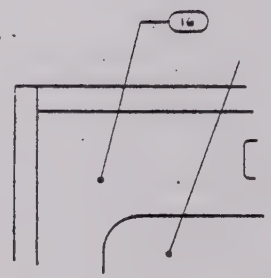
Drawing Title	Customer No.	Librascope No.	Revision
COMPUTER PROGRAMMER MODEL CP-7	—	L200024705	1

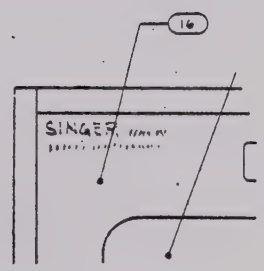
ADD BUS BAR INSTALLATION CHART TO F/D:

BUS BAR INSTACLATION CHART

STARING CONN & PIN NO.	TERMINATING CONN & PIN NO.	BUS BAR ITEM NO.
XA1-A	XA11-1	25
XA1-Z	XA11-22	25

SH 1, ZONE 4 D ADD:





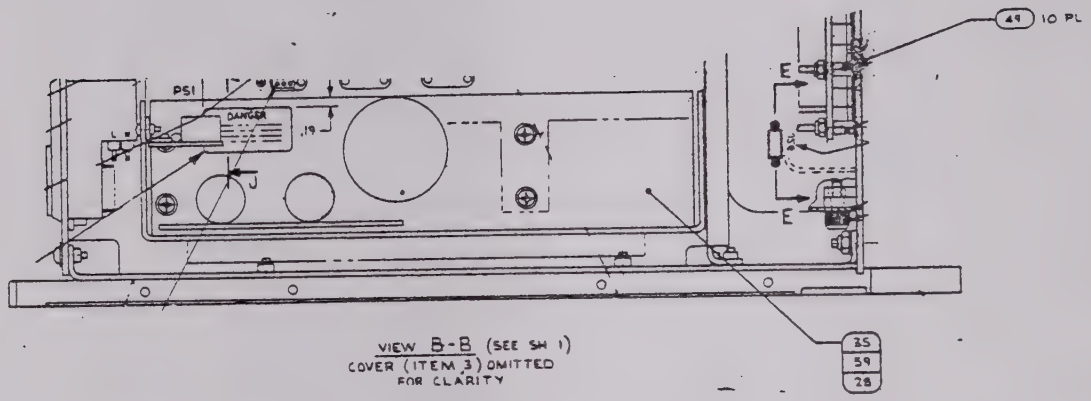
3125-7 9/75

3126-4 8/74

ENGINEERING ORDER | NOTICE OF REVISION | SINGER LIBRASCOPE DIVISION CODE IDENT 36090 | SHEET 3

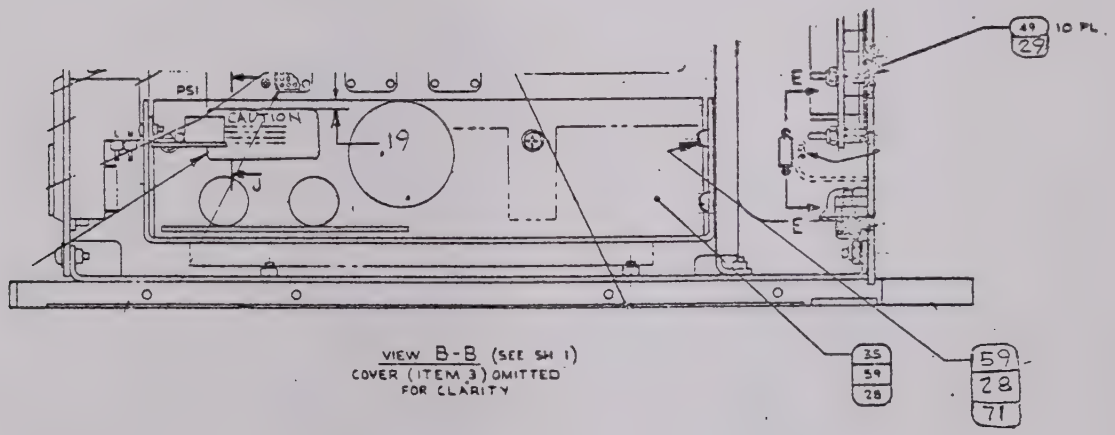
Drawing Title	Customer No.	Librascope No.	Revision
COMPUTER PROGRAMMER MODEL CP-7		L200024705	1

SH 2 ZONE 2C THRU 5 C



VIEW B-B (SEE SH 1)
COVER (ITEM 3) OMITTED
FOR CLARITY

1S:



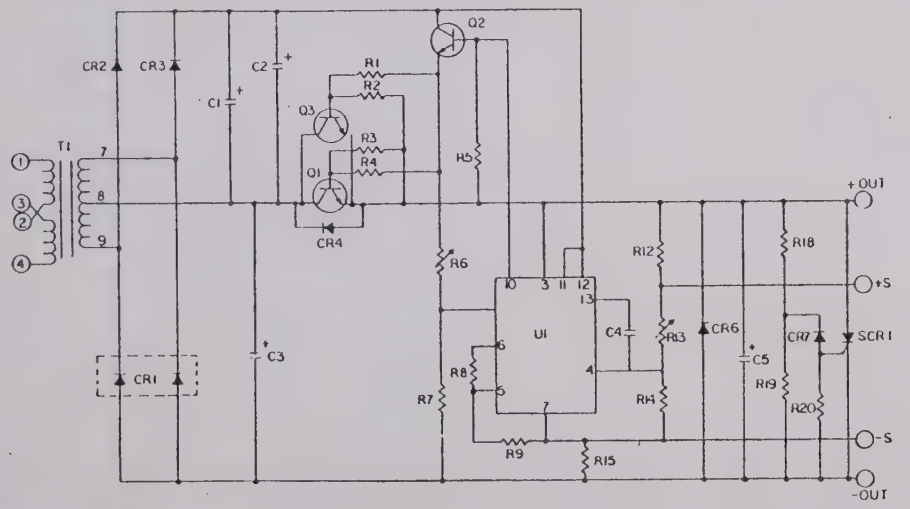
VIEW B-B (SEE SH 1)
COVER (ITEM 3) OMITTED
FOR CLARITY

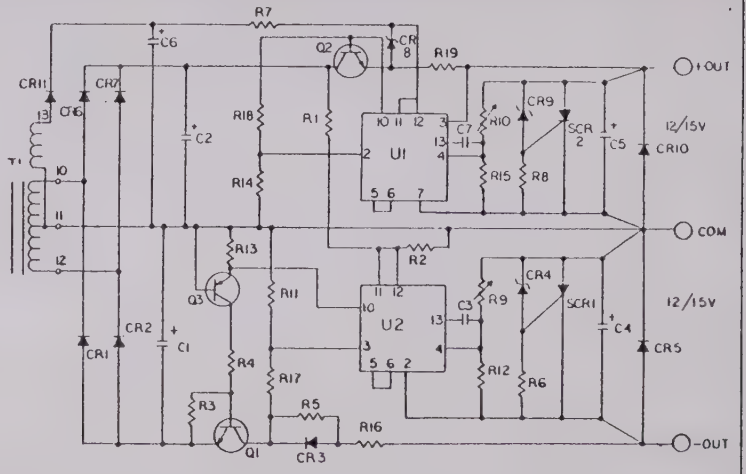
S/B:

REF DES	HD5-12 OVP		DESCRIPTION
C4	.001/100		CAPACITOR MYLAR
C1,2,5	1000/16		ALUM. ELECT.
C3	40000/15		CAPACITOR ALUM. ELECT.
CR1	R711A		DIODE BRIDGE
CR2,3,4	AE1C		1A 200V
CR6	AE3B		3A 100V
CR7	IN752A		DIODE ZENER
Q1,2,3	2N3055		TRANSISTOR
SCR1	S0508LS3		SCR 8A
U1	µa723		I.C. VOLTAGE REGULATOR
R1,4	3.9Ω		RESISTOR ½W 5% CARBON
R2,3,12,15,18	6.8Ω		
R5,8,9,7	2.2K		½W 5% CARBON
R14	1.6K		RESISTOR ¼W 2% MF
R19,20	82Ω		RESISTOR ½W 5% CARBON
R6,13	1.5K		POTENTIOMETER 2W WW
T1	12266		TRANSFORMER
PCB	11050		PRINTED CIRCUIT BOARD
CHASSIS	11141		CHASSIS ALUM

REF. DES.	HB8IS	HB8IS OVP	DESCRIPTION
C1,2	8300/35	8300/36	CAPACITOR ALUM. ELECT.
C6,4,5	100/35	100/85	ALUM. ELECT.
C3,7	.001/100	.01/100	CAPACITOR MYLAR
CR1,2,6,7,3	AE3B	AE3B	DIODE 3A 100V
CR5,10	——	——	
CR11	AE1C	AE1C	1A 200V
CR4,9	——	IN720(15V) IN718(12V)	DIODE, ZENER
SCR1,2	——	S0303LS3	SCR 3A
Q3	2N2905	2N2905	TRANSISTOR
Q1,2	2N3055	2N3065	TRANSISTOR
U1,2	µa723	µa723	IC VOLTAGE REGULATOR
R19,16	.22	.22	RESISTOR 2W, WW, BHW
R15,12	1K	1K	½W, CARBON
R18,R17	220Ω	220Ω	
R13,1,2	330Ω	330Ω	
R14,11	4.7K	4.7K	
R3,7	2.7Ω	2.7Ω	
R6,8	——	47Ω	RESISTOR ½W, CARBON
R9,10	1.5K	1.5K	POTENTIOMETER, 2W, WW
PCB	12080	12080	PRINTED CIRCUIT BOARD

12079



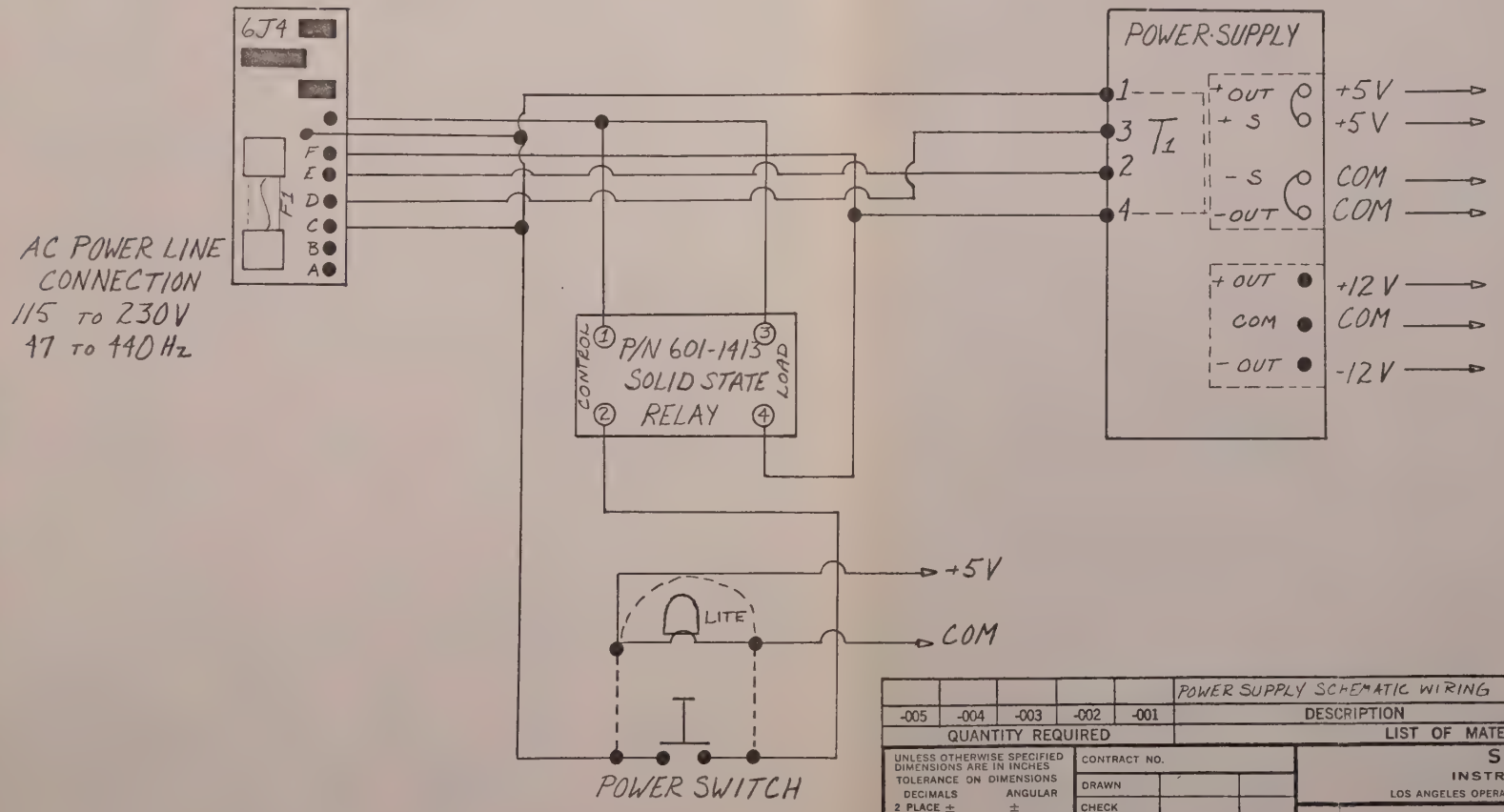


THE INFORMATION AND DESIGN CONTAINED HEREIN ARE THE PROPERTY OF POWER ONE AND THE UNAUTHORIZED USE THEREOF IS PROHIBITED

PROPRIETARY STATEMENT
THIS DOCUMENT DISCLOSES INFORMATION AND DATA IN WHICH THE SINGER CO. HAS PROPRIETARY RIGHTS. NEITHER RECEIPT NOR POSSESSION THEREOF CONFERS OR TRANSFERS ANY RIGHT TO REPRODUCE, USE OR DISCLOSE IN WHOLE OR IN PART EXCEPT BY WRITTEN PERMISSION FROM THE SINGER CO.

CLASS CODE

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



					POWER SUPPLY SCHEMATIC WIRING		1
-005	-004	-003	-002	-001	DESCRIPTION	PART NO.	ITEM
QUANTITY REQUIRED					LIST OF MATERIALS		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON DIMENSIONS DECIMALS 2 PLACE ± 3 PLACE ± ANGULAR ±	CONTRACT NO.	SINGER INSTRUMENTATION LOS ANGELES OPERATION LOS ANGELES, CALIF.	
MATERIAL	DRAWN	CP7 POWER	
	CHECK		
	ELEC ENGR		
	MECH ENGR		
	APPROVED		
FINISH:	SCHEMATIC NO.	SIZE B / CODE IDENT NO. 88869 / DWG NO. 2- / REV	
MODEL NO.	NEXT ASSEMBLY NO.	SCALE	SHEET / OF /

NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

POWER-ONE Inc.
531 DAWSON DR.
CAMARILLO, CALIF. 93010
(805) 484-2806

APPLICATION DATA
Including:
1. Schematic
2. Parts Lists
3. Specification
4. Outline & Mounting Dwg.
5. General User Information

MODEL

HDBB-105W

SPECIFICATIONS

AC Input: 115/230 VAC ±10% 47-440 HZ(Derate Current 10% for 50 HZ operation)

Input Fusing: See Table

DC Output: 5VDC @ 12A, OVP @ 6.2 ± .4VDC & ± 12V @ 1.7A or ± 15V @ 1.5A

Line Regulation: ± .05% for a 10% input change

Load Regulation: ± .05% for a 50% load change

Output Ripple: 1.5 mv Pk-Pk, 0.4 mv RMS

Transient Response; 30μ sec for 50% load change

Overload & Short Circuit Protection: Automatic current limit/foldback

Temperature Coefficient: ± .03%/°C maximum

Cooling: Units are full rated to 50°C in free air, must be derated or fan cooled when mounted in confined area

Temperature Rating: 0 - 50°C, full rated, derate linearly to 40% at 70°C

Efficiency: 55% at nominal input, full load on output

Weight: 8 lbs.

Vibration: Per Mil-Std-810B, method 514, proc. I, curve AB(to 50 HZ)

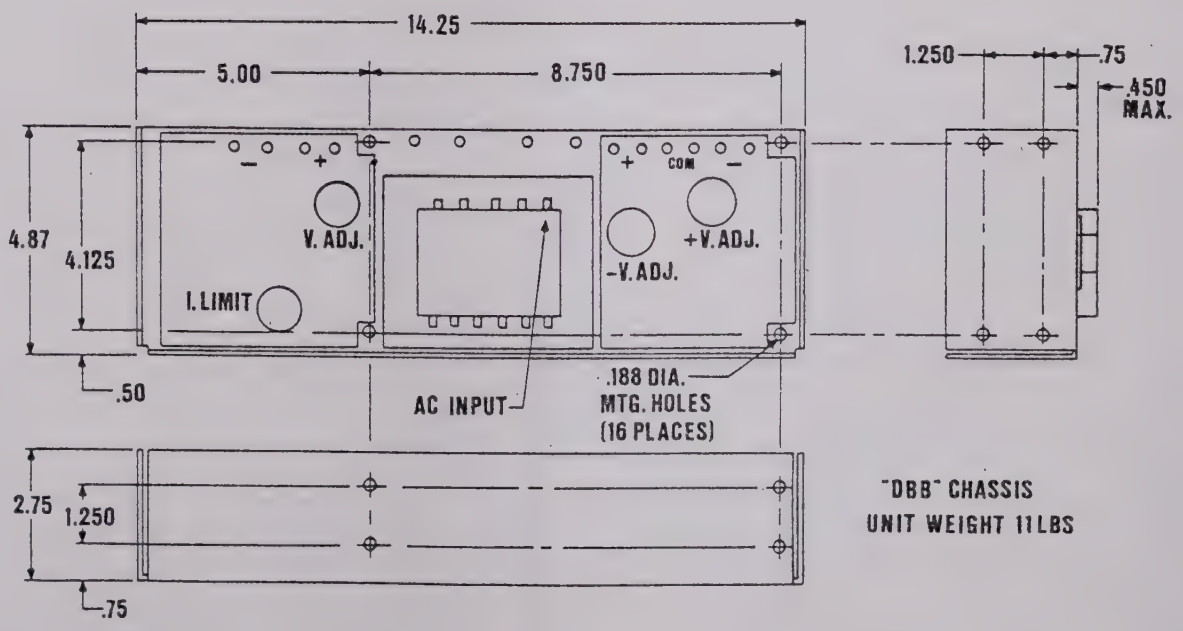
Shock: Per Mil-Std-810B, method 516, procedure V

Remote Sensing: Provided on 5V output, open lead protection built in.

AC Connection & Fuse Table			
For Use At	Primary Fuse At	Connect	Apply Power to
115	3A	1-3, 2-4	1 & 4
230	1.5A	2-3	1 & 4

2 YEAR GUARANTEE

POWER-ONE will repair or replace any power supply of its manufacture that does not perform to published specifications as a result of defective materials or workmanship for a period of 2 years from date of original purchase. No other obligations or liabilities are implied or expressed. Returns must be freight prepaid.

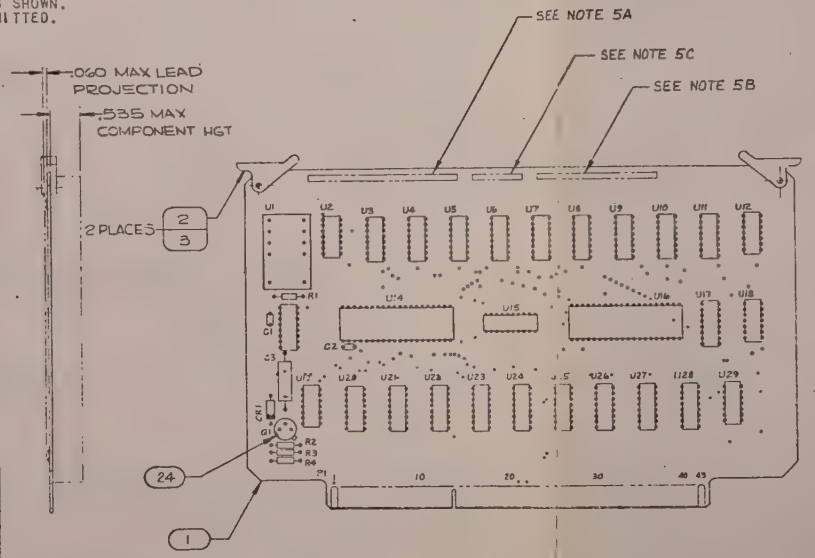


NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 593
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	2	INC EO 1-2	22-10-2	



FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
26	1		L 531003175	DIODE (IN914)
25	1		L 604005069	RESISTOR, 300 OHM ±5%, ¼W
24	1		L 511000308	INSULATOR, TRANSISTOR
23	2		L609002348	CAPACITOR, FIXED, CERAMIC, 0.1UF
22	1		T537028501	IC, CLOCK, FULL FUNCTION, 10 MHz (MC6871A)
21	1		L604005099	RESISTOR, 5100 OHM ±5%, 1/4W
20	2		L604005034	RESISTOR, 10 OHM ±5%, 1/4 W
19	1		L609021831	CAPACITOR, TANT, 15UF
18	1		L532000402	TRANSISTOR (2N2222A)
17	1		L537000276	IC, DECODER/MULTIPLEXER, DUAL 2-LINE
16	1		L537000297	DECODER/MULTIPLEXER, DUAL 2-4 LINE
15	1		L566000077	RESISTOR NETWORK, 1K OHMS
14	1		L537000271	TRIPLE, 3-INPUT, AND GATE (74LS10)
13	1		L537000265	QUAD, 2 INPUT, NAND GATE (74LS00)
12	2		L537000266	HEX INVERTER (74LS04)
11	1		L537000268	IC, HEX INVERTER, BUFFER/DRIVER (7406)
10				
9	8		L537000293	IC, RAM, STATIC, 1024X1 (2102)
8	6		L537000294	HEX BUFFER TRI-STATE (8T26)
7	3		L537000282	HEX INVERTER, TRI-STATE (8T97)
6	1		L537000295	BUFFER, OCTAL, TRI-STATE (DM81LS95)
5	1		L537000289	8-BIT MICROPROCESSOR (MC6800)
4	1		L537000290	IC, PERIPHERAL INTERFACE (MC6821)
3	2		H593160704	P.N SPRING, SLOTTED
2	2		L200024675	EJECTOR, CIRCUIT CARD
1	1		L535200593	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
CR1	26
R4	25
C1, C2	23
U1	22
R2	21
R1, R3	20
C3	19
Q1	18
U17	17
U11	16
U13	15
U29	14
U12	13
U2, U18	12
U19	11
U3 — U10	9
U23 — U28	8
U20, U21, U22	7
U15	6
U14	5
U16	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 593

USED ON	QB7
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02
3 PLACE ± .010
4 PLACE ± .005
SURFACE TEXTURE
BREAK SHARP EDGES MAX
MATERIAL

DWN
CHK
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY MICROPROCESSOR 'B' MODULE

SIZE	FSCM NO	DWG NO
D	36090	L535 300593

SCALE 1/1 SHEET 1 OF 1

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐ SINGER LIBRASCOPE DIVISION CODE IDENT 36090 NOR NO. _____ SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSEMBLY MICROPROCESSOR I/O MODULE	Customer No. —	Librascope No. L535300593	Revision 2
Next Assembly: COMPUTER PROGRAMMER ☐ Multi-Use MODEL CP7	Customer No. of N/A —	Libra. No. of N/A L200 024 705	Class Chg II
Serialized Item Nomenclature	Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor (Sw)
End Item Nomenclature ☐ Multi-Use CPL	Cust. No. of End Item	Libra. No. of End Item	10-3 77

Reason for Revision: TO COMPLETE ASSY DRAWING

Change Requested on Contract: N/A

Change Order ☐ Drawing Change X

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
—	G Harris 30 SEPT 77	M. allison 77-10-2	*	*

Change Board: Chair. — Eng. — Q.C. — C.M. — Mfg. —

RFI No. — DCR No. —

ECP No. — D/W No. —

AFFECTED	YES	NO
Master Layout		X
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is		X	X	X
Rework	X			
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval Concurrence of Class N/A ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg. —

Serial Req. Backfit —

Serials in Compliance —

Mfg. Job No. Affected AB-401

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT
I/S "A" SIZE, 4 SHEETS S/B "D" SIZE.

IN P/L:

FIND NO. 10

I/S: 1 QTY L200 024 681 CRYSTAL, 4 MHz

S/B: "DELETED"

FIND NO. 22

I/S: 1 QTY, L537 000 291, IC, GEN DRIVER, CLOCK, 2 PH (MC6875)

S/B: 1 QTY, T537 028 501, IC, CLOCK, FULL FUNCTION, 1.0 MHz (MC6871AL)

FIND NO. 21

I/S: 1 QTY, L604 005 106, RESISTOR, 10K OHM ±5%, 1/4W

S/B: 1 QTY, L604 005 099, RESISTOR, 5100 OHM ±5%, 1/4W

FIND NO. 19

I/S: 1 QTY, L609 006 233, CAPACITOR, TANT, 1 UF

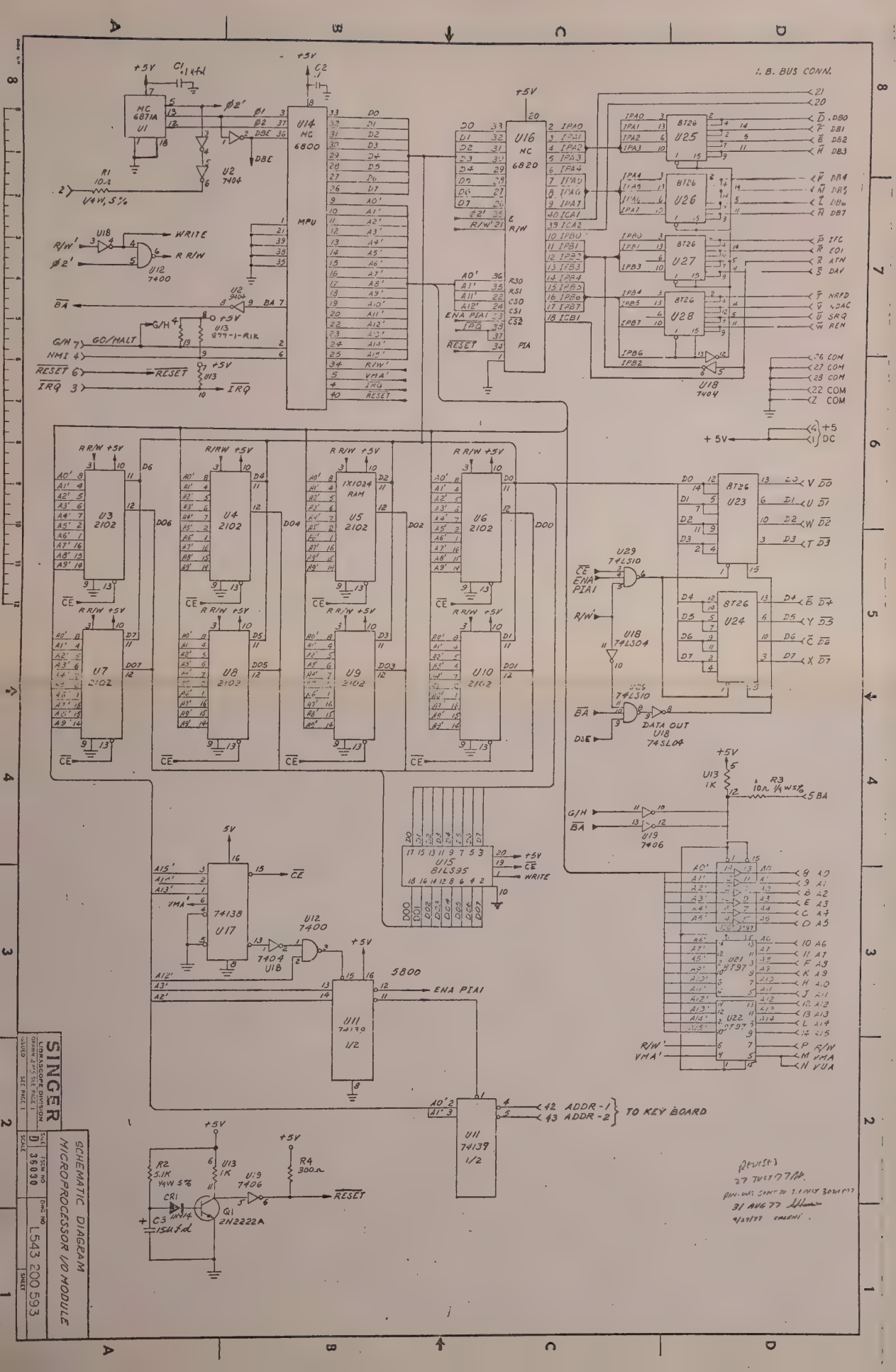
S/B: 1 QTY, L609 021 831, CAPACITOR, TANT, 15 UF

ADD

25, 1 QTY, L604 005 069, RESISTOR, 300 OHM ±5%, 1/4W

26, 1 QTY, L531 003 175, DIODE (IN914)

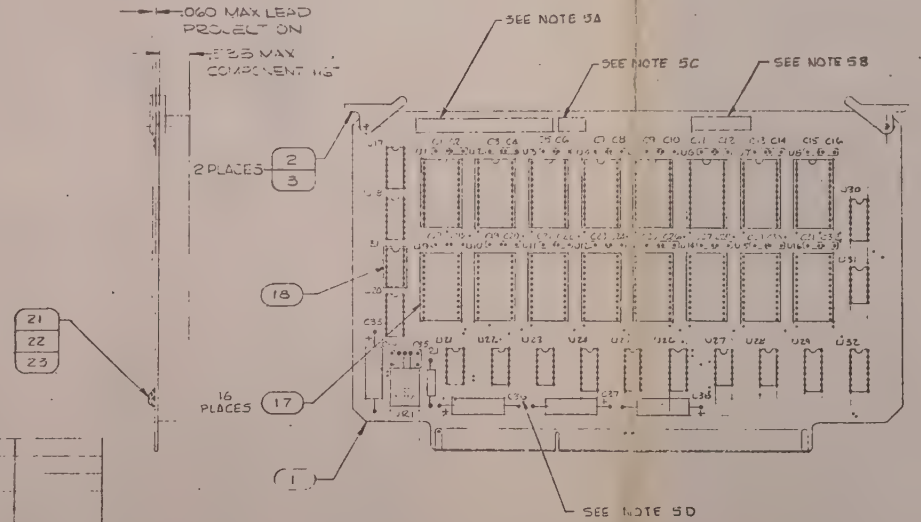
3125-7 9/75


I. B. BUS CONN.
MC 6871A U1
U14 MC 6800 MPU
U16 MC 6820 PIA
U2 7404
U12 7400
U18 7404
U25 BT26
U26 BT26
U27 BT26
U28 BT26
U23 BT26
U24 BT26
U21 BT97
U22 BT97
U3 2102
U4 2102
U5 2102 1X1024 RAM
U6 2102
U7 2102
U8 2102
U9 2102
U10 2102
U15 81LS95
U17 74138
U11 74LS90 1/2
U11 74139 1/2
U29 74LS10
U18 74LS04
U25 74LS10
U19 7406
U13 877-1-R1K
U13 1K
R1 10Ω
R2 5.1K 1/4W 5%
R3 10Ω 1/4W 5%
R4 300Ω
C1 .1μf
C2 .1
C3 15μf
CR1 1N914
Q1 2N2222A
WRITE
R R/W
GO/HALT
RESET
IRQ
DATA OUT
ENA PIA1
TO KEY BOARD
ADDR-1
ADDR-2
SINGER
LINK-SCOPE DIVISION
MICROPROCESSOR I/O MODULE
SCHEMATIC DIAGRAM
L543 200 593
36030
SCALE
SHEET
DRAWN
ISSUED
SEE PAGE 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 594
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

DESCRIPTION	DATE	APPROVED
ECO 1 & 2	2/15/77	



FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
23	1		H551160403	NUT HEX #4-40
22	2		H955160404	WASHER #4
21	1		H795160405	SCREW, #4-40 X 5/16
20	3		L537000281	IC, HEX INVERTER, TRI-STATE
19	1		TS40015701	HEADER ASSY
13	1		L530000174	SOCKET, SAE, 14 PIN
17	16		L530000175	SOCKET, DIP, 24 PIN
16	1		L604007505	RESISTOR, 4.3 OHM, 1W
15	4		L609030756	CAPACITOR, FIXED, TANT, 100UF
14	34		L609002348	CAPACITOR, FIXED, CERAMIC, 0.1UF
13	1		L537000286	VOLTAGE REGULATOR, LINEAR, NEG.
12	1		L537000266	IC, HEX INVERTER (74LS04)
11	1		L537000265	QUAD, 2-IN, NAND GATE (74LS00)
10	1		L537000270	QUAD, 2-IN, AND GATE (74LS08)
9	1		L537000271	TRIPLE, 3-IN, AND GATE (74LS10)
8	2		L566000077	RESISTOR NETWORK (1K OHM)
7	8		L537000280	8K UV ERASABLE PROM
6	2		L537000276	DECODER/MULTIPLEXER, 2-8LINE (74LS138)
5	2		L537000274	QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS86)
4	2		L537000282	IC, HEX INVERTER TRI-STATE
3	2		H795160304	PIN SPRING, SLOTTED
2	2		L200024675	ELECTOR, CIRCUIT CARD
1	1		L535200594	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
U17, U18, U26	20
Z1	19
R1	16
C33, C36-C38	15
C1-C32, C34, C35	14
VR1	13
U31	12
U27	11
U28	10
U23	9
U20, U30	8
U1-U8	7
U24, U25	6
U21, U22	5
U29, U32	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 594

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02 SURFACE
3 PLACE ± .010 TEXTURE
4 PLACE ± .0005
BREAK SHARP EDGES MAT
MATERIAL

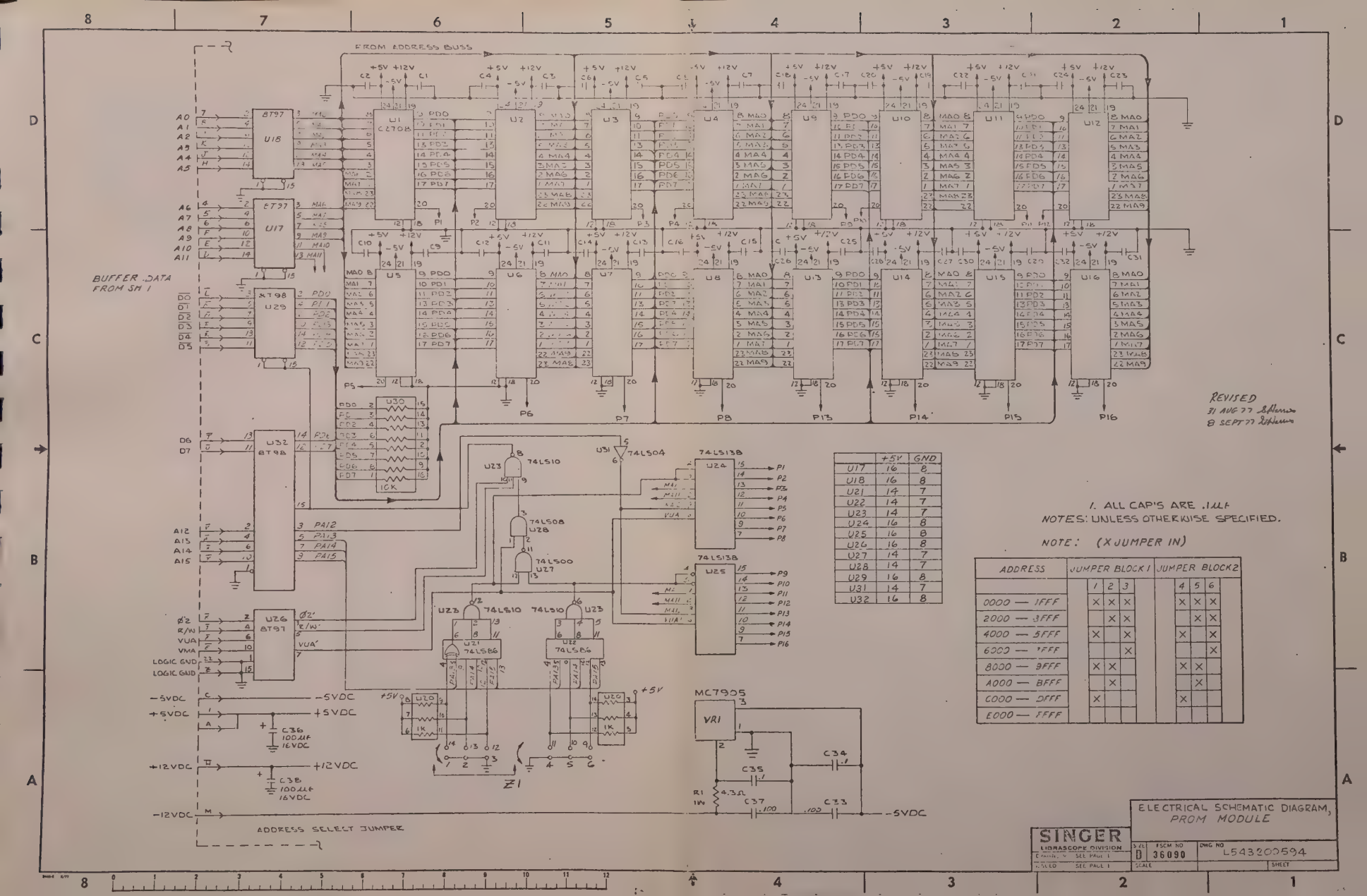
DWN
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
PROM MODULE

SIZE	FSCM NO	DWG NO
D	36090	L535 300 594

SCALE 1/1 SHEET 1 OF 1



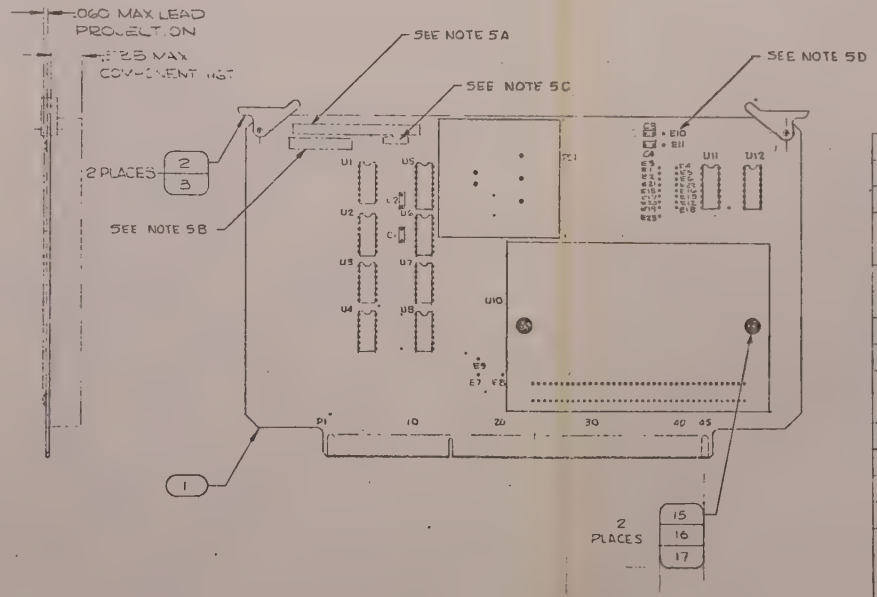
	+5V	GND
U17	16	8
U18	16	8
U21	14	7
U22	14	7
U23	14	7
U24	16	8
U25	16	8
U26	16	8
U27	14	7
U28	14	7
U29	16	8
U31	14	7
U32	16	8

ADDRESS	JUMPER BLOCK 1			JUMPER BLOCK 2		
	1	2	3	4	5	6
0000 — 1FFF	X	X	X	X	X	X
2000 — 3FFF		X	X		X	X
4000 — 5FFF	X		X	X		X
6000 — 7FFF			X			X
8000 — 9FFF	X	X		X	X	
A000 — BFFF		X			X	
C000 — DFFF	X			X		
E000 — FFFF						

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 595
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

ZONE	REV	DESCRIPTION	DATE	APPROVED
	C	INCORP. REV. B & C	10/12	



REFERENCE DESIGNATION	ITEM NO.
U7	14
C1	13
U11, U12	12
U1–U3	11
P51	10
C2–C4	9
U5	8
U10	7
U6	6
U8	5
U4	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 595

FIND NO.	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
20				
19				
18				
17	2		H955160403	WASHER, FLAT, CRES #4
16	2		H965500404	WASHER, LOCK, SPLIT, HELICAL #4
15	2		H795160403	SCREW, MACH, PAN HD, 4-40 X 3/16
14	1		L537000265	IC, QUAD, 2-IN, NAND GATE (74LS00)
13	1		L609002317	CAPACITOR, FIXED, CERAMIC, 470 PF
12	2		L537000283	IC, MULTIPLEXER, QUAD, 2-IN, TRI-STATE
11	3		L537000275	IC, QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS86)
10	1		L501000290	POWER SUPPLY, DC-DC CONV, DUAL ISYDC
9	3		L609002348	CAPACITOR, FIXED, CERAMIC, 0.1 UF
8	1		L566000077	IC, RESISTOR NETWORK (1 K OHM)
7	1		L414000138	MODULE, ELEC, DATA ACQUISITION SYS
6	1		L537000273	F-F, DUAL D-TYPE, EDGE TRIG. (MLS74)
5	1		L537000267	HEX INVERTER (74LS05)
4	1		L537000266	IC, HEX INVERTER (74LS04)
3	2		H593160904	PIN SPRING, SLOTTED
2	2		L200024675	EJECTOR, CIRCUIT CARD
1	1		L535300595	PRINTED WIRING BOARD

PARTS LIST

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR
2 PLACE ± .02
3 PLACE ± .010
4 PLACE ± .0005
SURFACE TEXTURE
BREAK SHARP EDGES MAX
MATERIAL

DWN ENV L5300??
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
DATA ACQUISITION MODULE

SIZE D | FSCM NO 36090 | DWG NO L535 300 595
SCALE 3/1 | SHEET 1 OF 1

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSY DATA ACQUISITION MODULE	Customer No. —	Librascope No. L535300595	Revision 2
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 ☐ Multi-Use	Customer No. of N/A —	Libra. No. of N/A L200024905	Class Chg E
Serialized Item Nomenclature	Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor BW
End Item Nomenclature: CP7 ☐ Multi-Use	Cust. No. of End Item —	Libra. No. of End Item —	9-21-77

Reason for Revision: UPDATE DWG

Change Requested on Contract: N/A

Change Order ☐ Drawing Change ☒

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. ALLISON 19SEPT'77	—	M. Allison 19SEPT'77	*	*

Change Board: Chair. — Eng. — Q.C. — C.M. — Mfg. —

RFI No. — DCR No. —

ECP No. — D/W No. —

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A

Concurrence of Class ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.

Serial Req. Backfit

Serials in Compliance

Mfg. Job No. Affected: A8-401

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT

WAS; "A" SIZE 4 SHEETS

INCORPORATED EO REV 1

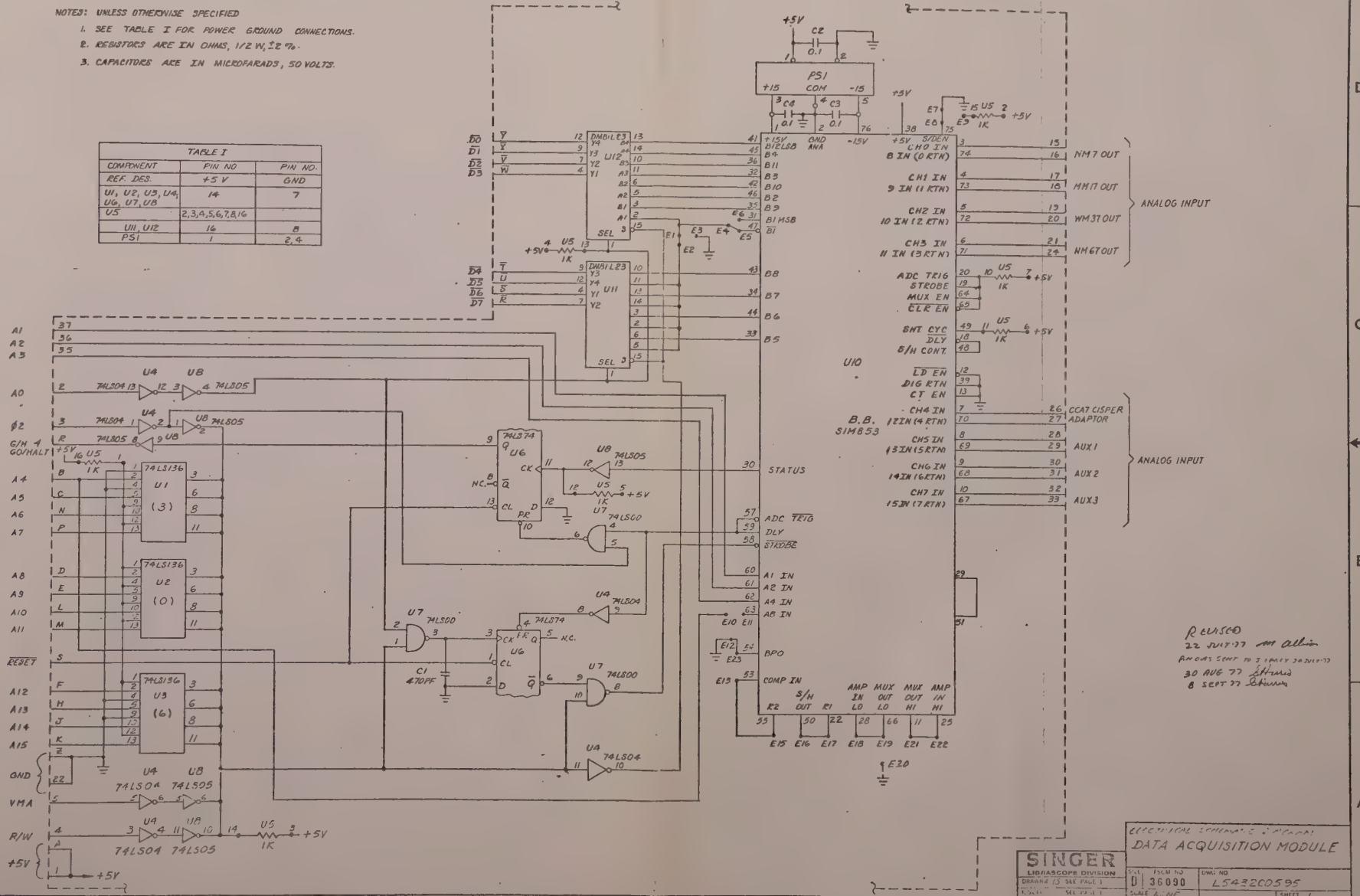
3125-7 9/75

NOTES: UNLESS OTHERWISE SPECIFIED

1. SEE TABLE I FOR POWER GROUND CONNECTIONS.
2. RESISTORS ARE IN OHMS, 1/2 W, ±2 %.
3. CAPACITORS ARE IN MICROFARADS, 50 VOLTS.

TABLE I

COMPONENT	PIN NO	PIN NO.
REF. DES.	+5 V	GND
U1, U2, U3, U4, U6, U7, U8	14	7
U5	2,3,4,5,6,7,8,16	
U11, U12	16	8
PS1	1	2,4



REVISED
22 JULY 77
AMOMS SENT TO J. IPKEY 28 JULY 77
30 AUG 77
8 SEPT 77

SINGER
LIBRASCOPE DIVISION

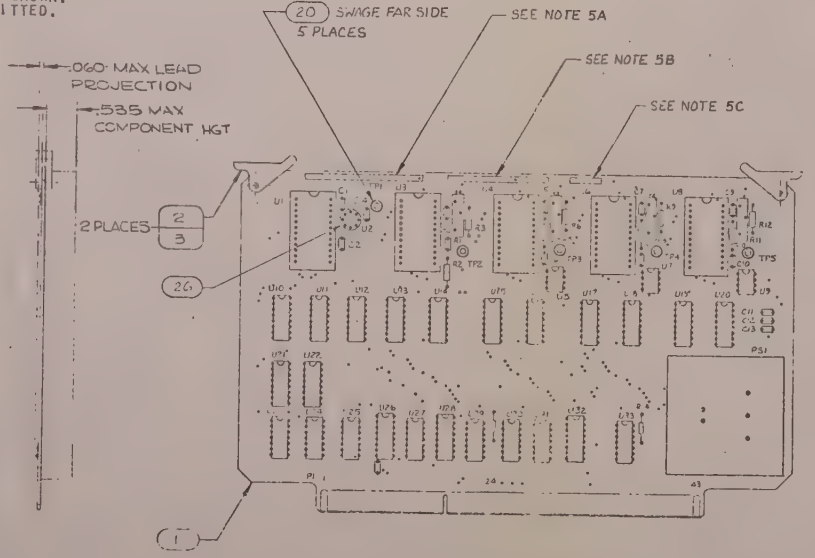
ELECTRICAL SCHEMATIC DIAGRAM
DATA ACQUISITION MODULE

SIZE D | FSCM NO 36090 | DWG NO L5432C0595 | SHEET 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 596
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

ZONE	REV	DESCRIPTION	DATE	APPROVED
	B	INC ECO 1, CHNG 3	[illegible]	[illegible]



FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
26	1		L511000366	TRANSIPAD
25	1		L609002318	CAPACITOR, 330 PF
24	1		L609002312	CAPACITOR, 100 PF
23	4		L604005040	RESISTOR, 18 OHM ±5%, 1/4 W
22	4		L604005184	RESISTOR, 18 MEG OHM ±5%, 1/4 W
21	4		L603002870	RESISTOR, VARIABLE, 10K
20	5		H948305012	TERMINAL, STUD
19	8		L609002336	CAPACITOR, .01UF
18	4		L537000278	IC, FLIP-FLOP, QUAD, D-TYPE (74LS175)
17	10		L537000277	IC, FLIP-FLOP, HEX, D-TYPE (74LS174)
16	3		L537000285	IC, LINEAR, AMPLIFIER, OPERATIONAL
15	1		L501000290	POWER SUPPLY, DC→DC CONV, ±15VDC
14	1		L537000272	IC, DUAL, 4-IN, AND GATE (74LS21)
13	1		L537000270	IC, QUAD, 2-IN, AND GATE (74LS08)
12	2		L604030073	RESISTOR, 1K OHM ±5%, 1/8 W
11				
10	3		L537000266	IC, HEX INVERTER (74LS04)
9	2		L537000276	IC, DECODER/MULTIPLEXER, 2→8 LINE (74LS138)
8	3		L537000275	IC, QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS136)
7	5		L609002348	CAPACITOR, FIXED, CERAMIC, 0.1UF
6	1		L537000288	IC, LINEAR, AMPLIFIER, OPERATIONAL
5	4		L537000308	IC, D/A CONVERTER, 12 BIT
4	1		L537000307	IC, D/A CONVERTER, 16 BIT
3	2		H593-60904	PIN SPRING, SLOTTED
2	2		L200024675	EJECTOR, CIRCUIT CARD
1	1		L535200596	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
C15	25
C14	24
R2, R4, R7, R10	23
R3, R6, R9, R12	22
R1, R5, R8, R11	21
TP1 - TP5	20
C3 - C10	19
U11, U21, U22, U32	18
U10, U12 - U20	17
U5, U7, U9	16
PS1	15
U27	14
U33	13
R13, R14	12
U23 - U25	10
U26, U28	9
U29 - U31	8
C1, C2, C11 - C13	7
U2	6
U3, U4, U6, U8	5
L1	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 596

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02
3 PLACE ± .010
4 PLACE ± .0005
BREAK SHARP EDGES
MATERIAL

DWN [illegible]
CHKD [illegible]
APVD [illegible]
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
ANALOG OUTPUT MODULE

SIZE	FSCM NO	DWG NO
D	36090	L535 300 596

SCALE 1/1 SHEET 1 OF 1

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSY ANALOG OUTPUT MODULE	Customer No.: —	Librascope No.: L535 300 596	Revision: 3
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 ☐ Multi-Use	Customer No. of N/A: —	Libra. No. of N/A: L200 024 705	Class Chg: II
Serialized Item Nomenclature	Cust. No. of Ser. Item: —	Libra. No. of Ser. Item: —	Rel Coor: BW
End Item Nomenclature: CP7 ☐ Multi-Use	Cust. No. of End Item: —	Libra. No. of End Item: —	9-30-77

Reason for Revision: TO COMPLETE ASSY DRAWING

Change Requested on Contract: N/A

Change Order ☐ Drawing Change ☒

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. ALLISON 28 SEPT '77	G Harris 29 SEPT 77	M. Allison 77-9-30	*	*

Change Board	Date
Chair.	
Eng.	
Q.C.	
C.M.	
Mfg.	

RFI No. | DCR No.

ECP No. | D/W No.

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is		X	X	X
Rework	X			
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A
Concurrence of Class ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.

Serial Req. Backfit

Serials in Compliance

Mfg. Job No. Affected: A 8-401

DESCRIPTION OF CHANGE

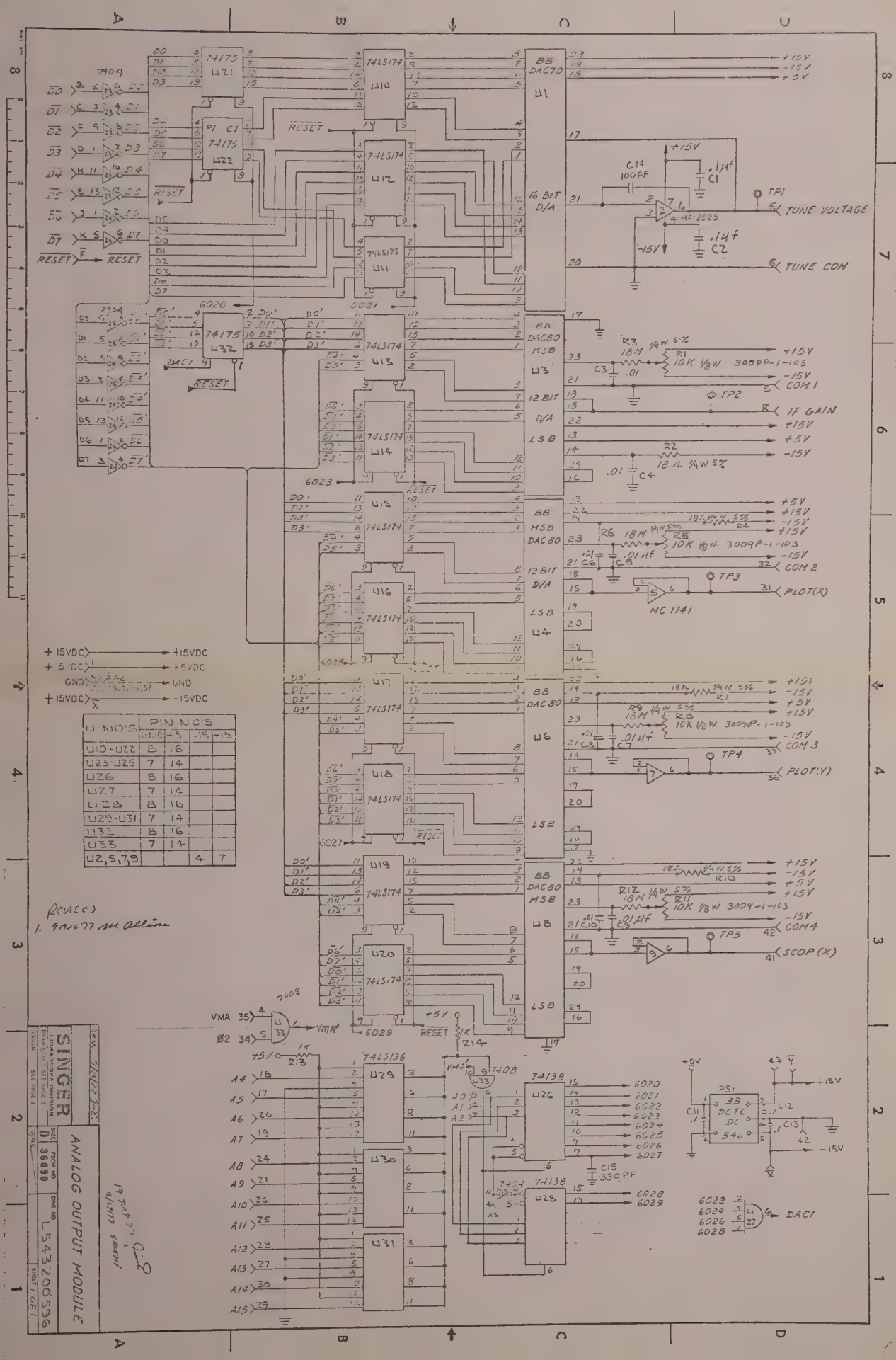
REVISED AND REDRAWN ON NEW FORMAT

WAS: "A" SIZE 4 SHEETS
INC EO REV 1 & 2

IN P/L: ADD

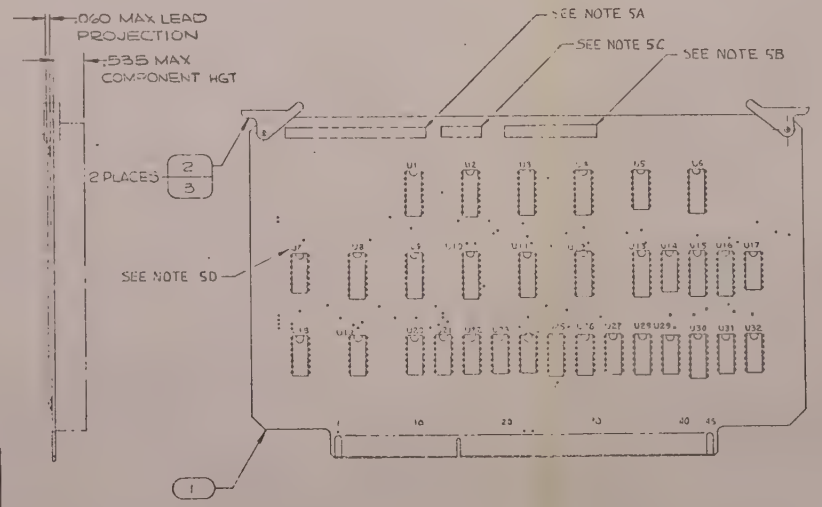
FIND NO. 26 1 QTY L511 000 366 TRANSIPAD

3125-7 9/75


ANALOG OUTPUT MODULE
SINGER
LINK-SCOPE DIVISION
DRAWING NO. L543200596
SIZE D
FSCM NO 36090
SHEET 1 OF 1
74175 U21
74175 U22
74175 U32
74LS174 U10
74LS174 U12
74LS175 U11
74LS174 U13
74LS174 U14
74LS174 U15
74LS174 U16
74LS174 U17
74LS174 U18
74LS174 U19
74LS174 U20
74LS136 U29
U30
U31
74138 U26
74138 U28
7408 U33
7404
BB DAC70 U1
BB DAC80 MSB U3
BB MSB DAC80 U4
BB DAC80 MSB U6
BB DAC80 MSB U8
16 BIT D/A
12 BIT D/A LSB
MC 1741
HA-2625
TUNE VOLTAGE
TUNE COM
IF GAIN
COM 1
COM 2
COM 3
COM 4
PLOT(X)
PLOT(Y)
SCOP(X)
+15V
-15V
+5V
GND
RESET
DAC1
PS1
DC TC DC 540
U-NIO'S
PIN NO'S
U10-U22
U23-U25
U26
U27
U29
U29-U31
U32
U33
U2,5,7,9

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 597
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.



FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
20				
19				
18				
17				
16				
15				
14				
13	1		L566000077	IC, RESISTOR NETWORK (1 K OHM)
12	4		L537000278	FLIP-FLOP, QUAD, D-TYPE (74LS175)
11	2		L537000266	HEX INVERTER (74LS04)
10	1		L566000071	RESISTOR NETWORK (1 K OHM)
9	4		L537000306	HYBRID, QUAD TRANSISTOR (2N2222)
8	2		L537000276	DECODER/MULTIPLEXER 2-8 LINE (74LS138)
7	3		L537000275	QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS136)
6	3		L537000269	HEX BUFFER/DRIVER (7407)
5	6		L537000296	HEX INVERTER, BUFFER/DRIVER (7406)
4	6		L537000277	IC, FLIP-FLOP, HEX, D-TYPE (74LS174)
3	2		H593160204	PIN SPRING, SLOTTED
2	2		L200024675	ELECTOR, CIRCUIT CARD
1	1		L535200597	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	REV NO.
U1	13
U6, U10, U12, U13	12
U7, U16	11
U35	10
U28, U29, U31, U32	9
U1, U2	8
U24–U26	7
U5, U14, U17	6
U18–U23, U27	5
U3, U4, U7, U11, U15, U16	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 597

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02 SURFACE
3 PLACE ± .010 TEXTURE
4 PLACE ± .005
BREAK SHARP EDGES MAX
MATERIAL

DWN
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
AUXILIARY CONTROLLER

SIZE	FSCM NO	DWG NO
D	36090	L535 300 597

SCALE 1/1 SHEET 1 OF 1

ENGINEERING ORDER [X] NOTICE OF REVISION [ ]

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSEMBLY AUXILIARY CONTROLLER	Customer No. —	Librascope No. L535300597	Revision 2
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 [ ] Multi-Use	Customer No. of N/A —	Libra. No. of N/A L200024705	Class Chg II
Serialized Item Nomenclature	Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor Bw
End Item Nomenclature: CP7 [ ] Multi-Use	Cust. No. of End Item —	Libra. No. of End Item —	9-21-77

Reason for Revision: TO COMPLETE ASS'Y DRAWING

Change Requested on Contract: N/A

Change Order [ ] Drawing Change [X]

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. Allen 19SEPT'77	—	M. Allen 21SEPT'77	*	*

Change Board	Date
Chair.	Eng. Q.C.
C.M.	Mfg.

RFI No. | DCR No.

ECP No. | D/W No.

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A
Concurrence of Class [ ]

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.

Serial Req. Backfit

Serials in Compliance

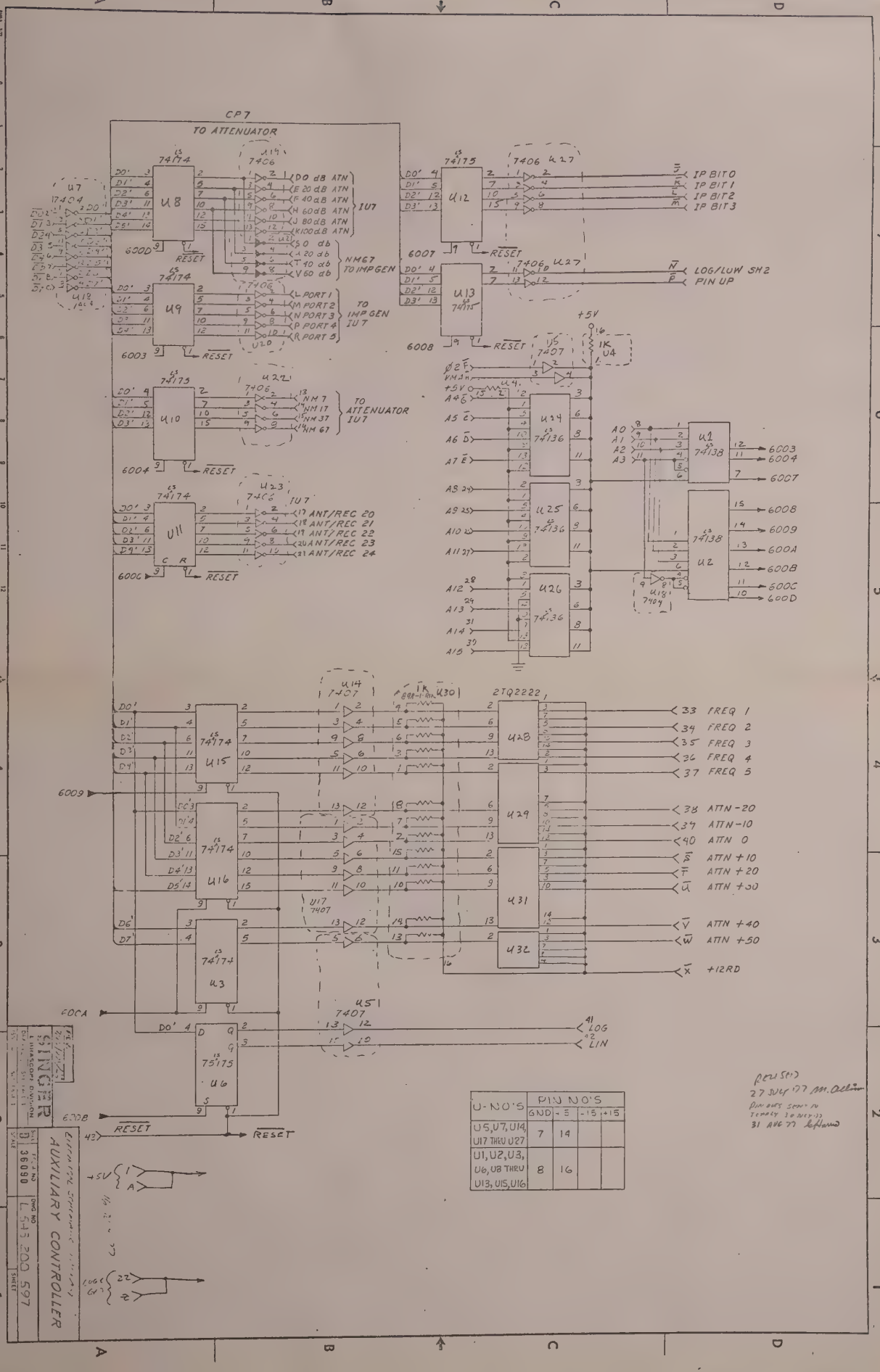
Mfg. Job No. Affected: A8-401

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT
WAS! "A" SIZE 4 SHEETS

INCORPORATED EO REV 1

3125-7 9/75



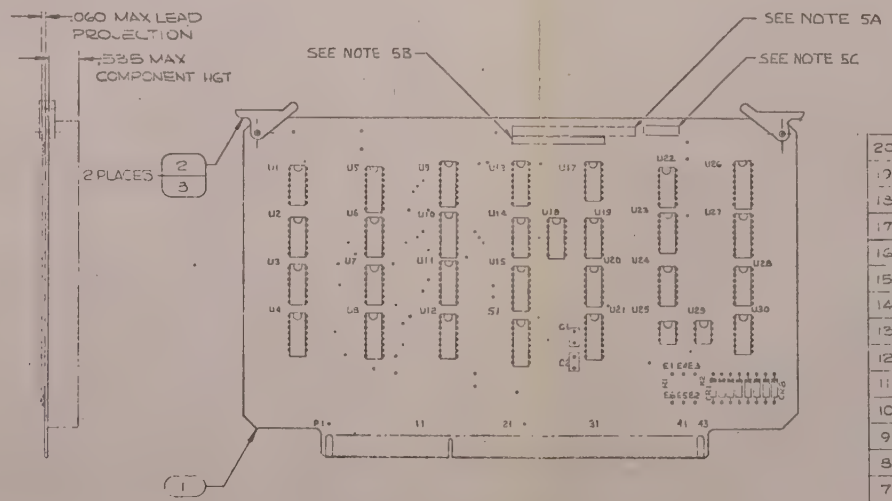
U-NO'S	PIN NO'S			
	GND	-5	-15	+15
U5, U7, U14, U17 THRU U27	7	14		
U1, U2, U3, U6, U8 THRU U13, U15, U16	8	16		

REVISED
27 JULY 77 M. Allin
PIN OUTS CORRECTED
TEMPLY 30 NOV 77
31 AUG 77 Lefland

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 598
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

ZONE	REV	REVISIONS DESCRIPTION	DATE	APPROVED
	C	INCORPORATED	6-5-77	



FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
20	2		T537012002	I C, FET SWITCH DRIVER
19	3		L537000278	I C, QUAD FLIP FLOP, D TYPE (74LS75)
18	1		L600001889	SWITCH
17	2		L609002348	CAPACITOR, .1uF ±10% 50V
16	2		L537000285	I C, OPERATIONAL AMPLIFIER
15	1		L537000273	I C, DUAL FLIP FLOP, D TYPE (74S74)
14	2		L537000276	I C, DECODER/MULTIPLEXER 2-8 LINE (74LS138)
13	3		L537000275	I C, QUAD 2 IN EXCLUSIVE OR GATE (74LS86)
12	2		L566000083	I C, RESISTOR NETWORK 4.7K
11	1		L566000077	I C, RESISTOR NETWORK 1K
10	8		L531003175	DIODE (1N914)
9	4		L537000306	I C, HYBRID QUAD TRANSISTOR
8	1		L537000284	I C, QUAD SPST ANALOG SW
7	2		L537000269	I C, HEX BUFFER / DRIVER (7407)
6	1		L537000268	I C, HEX INVERTER (7406)
5	3		L537000265	I C, HEX INVERTER (74LS04)
4	2		L537000277	I C, HEX FLIP FLOP, D TYPE (74S174)
3	2		H595160704	PIN SPRING, SLOTTED
2	2		L200024G75	EJECTOR, CIRCUIT CARD
1	1		L535200598	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
U23, U24	20
U5, U9, U10	19
S1	18
C1, C2	17
U25, U29	16
U6	15
U8, U15	14
U1, U2, U3	13
U26, U27	12
U13	11
C4 - C18	10
U17, U19, U28, U30	9
U21	8
U7, U14	7
U22	6
U4, U16, U20	5
C3, C2	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 598

LAST ASSY USED	OP7
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR
2 PLACE ± .02
3 PLACE ± .010
4 PLACE ± .0005
SURFACE TEXTURE
BREAK SHARP EDGES MAX
MATERIAL

DWN
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
EMI METER CONTROLLER

SIZE	FSCM NO	DWG NO
D	36099	L535 300 598

REV C
SHEET 1 OF 1

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASS'Y EMI METER CONTROLLER	Customer No.: —	Librascope No.: L535300598	Revision: 2
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 ☐ Multi-Use	Customer No. of N/A: —	Libra. No. of N/A: L200024705	Class Chg: II
Serialized Item Nomenclature	Cust. No. of Ser. Item: —	Libra. No. of Ser. Item: —	Rel Coor: BW
End Item Nomenclature: CP7 ☐ Multi-Use	Cust. No. of End Item: —	Libra. No. of End Item: —	9-21-77

Reason for Revision: TO COMPLETE ASS'Y DRAWING

Change Requested on Contract: N/A

Change Order: ☐ Drawing Change: ☒

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. ALLISON 16SEPT77	P.W. 16SEP77	M. Allison 16SEPT77	*	*

Change Board: Chair. — Eng. — Qc. — C.M. — Mfg. —

RFI No.: DCR No.:

ECP No.: D/W No.:

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.	X	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval: N/A

Concurrence of Class ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.:

Serial Req. Backfit:

Serials in Compliance:

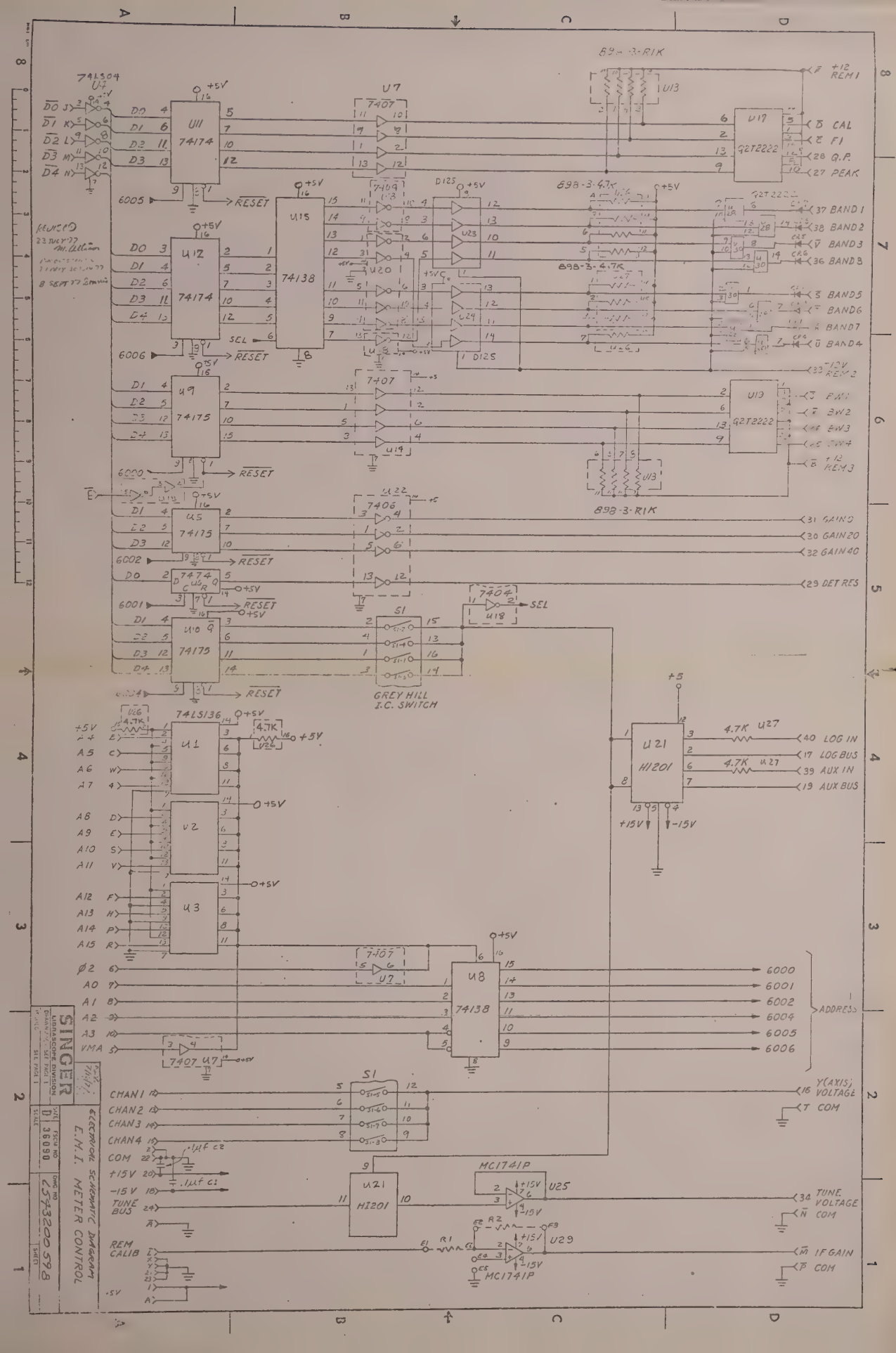
Mfg. Job No. Affected: A8-401

DESCRIPTION OF CHANGE: REVISED & REDRAWN ON NEW FORMAT

WAS: "A" SIZE 4 SHEETS

INC EO REV 1

3125-7 9/75

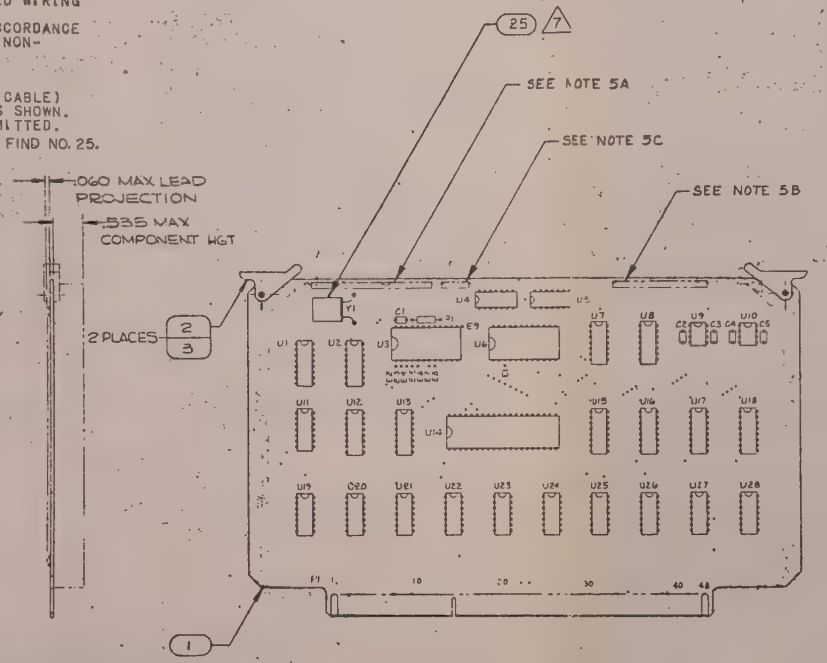

74LS04
U7
+5V
D0 J
D1 K
D2 L
D3 M
D4 N
U11
74174
D0
D1
D2
D3
6005
RESET
U7
7407
U15
74138
SEL
6006
U12
74174
U9
74175
6000
U5
74175
6002
U10
74175
6001
74LS136
U1
U2
U3
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
Ø2
A0
A1
A2
A3
VMA
U8
6000
6001
6002
6004
6005
6006
ADDRESS
898-3-RIK
U13
U17
G2T2222
F +12 REM1
B CAL
E FI
28 Q.P.
27 PEAK
37 BAND1
38 BAND2
V BAND3
36 BAND8
S BAND5
T BAND6
R BAND7
U BAND4
33 +12V REM2
U19
J FM1
Z BW2
BW3
BW4
B +12 REM3
898-3-4.7K
U26
U24
U22
7406
31 GAIN0
30 GAIN20
32 GAIN40
29 DET RES
7474
7404
U18
SEL
S1
GREY HILL
I.C. SWITCH
U27
4.7K
40 LOG IN
17 LOG BUS
39 AUX IN
19 AUX BUS
U21
HI201
+15V
-15V
CHAN1
CHAN2
CHAN3
CHAN4
COM
TUNE BUS
REM CALIB
.1µf C2
.1µf C1
MC1741P
U25
U29
R1
R2
34 TUNE VOLTAGE
N COM
M IF GAIN
P COM
Y(AXIS) VOLTAGE
T COM
SINGER
LIBRASCOPE DIVISION
ELECTRONIC SCHEMATIC DIAGRAM
E.M.I. METER CONTROL
FSCM NO 36090
DWG NO 2543200-598
SIZE D
SHEET

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 300 615
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

⚠7 BOND FIND NO. 19 TO FIND NO 1 USING FIND NO. 25.

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	2	INC ECO 1 & 2	17-10-7	



FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
25	AR		L101 000 896	URETHANE BOND
24	2		H593 160 904	MOUNTING PIN
23	2		L200 024 675	EJECTOR, CIRCUIT CARD
22	1		L546 000 079	RESISTOR NETWORK, 1KΩ
21	1		L604 005 082	RESISTOR, 1KΩ, ±5%, 1/4W
20	5		L609 002 348	CAPACITOR, .1UF
19	1		L200 024 680	CRYSTAL, 1.8432 MHz (MP018)
18	2		L537 000 285	IC, LINEAR AMPLIFIER, OPERATIONAL (MC1741P)
17	4		L537 000 298	IC, REGISTER, 4 BIT D TYPE (74LS173)
16	1		L537 000 276	IC, DECODER/MUTIPLEXER (74LS138)
15	3		L537 000 275	IC, QUAD 2-IN, EXCLUSIVE-OR GATE (74LS136)
14	1		L537 000 269	IC, HEX BUFFER/DRIVER (7407)
13	4		L537 000 266	IC, HEX INVERTER (74LS04)
12	3		L537 000 296	IC, HEX INVERTER, BUFFER/DRIVER (7406)
11	1		L537 000 270	IC, QUAD 2-INPUT, AND GATE (74LS08)
10	1		L537 000 281	IC, HEX INVERTER, TRI-STATE (8T97)
9	2		L537 000 294	IC, HEX BUFFER, TRI-STATE (8T26)
8	1		L537 000 290	IC, ADAPTER, PERIPHERAL (MC6820)
7	1		L537 000 302	IC, ADAPTER, COMMUNICATIONS (MC6850)
6	1		L537 000 300	IC, RECEIVER, QUAD LINE (MC1489AL)
5	1		L537 000 299	IC, DRIVER, QUAD LINE (MC1488L)
4	1		L537 000 301	IC, GENERATOR, BIT RATE (MC14411F)
3	2		H593160904	PIN, SPRING, SLOTTED
2	2		L200024675	EJECTOR, CIRCUIT CARD
1	1		L535200615	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
R1	21
C1, C2, C3, C4, C5	20
Y1	19
U1	22
U25	14
U22, U23, U24	12
U19, U20	15
U15, U16, U17, U18	17
U14	8
U12, U13	18
U9, U10	9
U8	11
U7, U26, U27, U28	13
U6	7
U5	5
U4	6
U3	4
U2	16
U1	10

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 615

L200 024 705	CP7
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR =
2 PLACE ± .02
3 PLACE = .010
4 PLACE = .0005
SURFACE TEXTURE
BREAK SHARP EDGES MAX
MATERIAL

DWN Glenn Sisk
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
INTERFACE MODULE

SIZE	FSCM NO	DWG NO
D	36090	L535 300 615

SCALE 1/1 SHEET 1 OF 1

ENGINEERING ORDER ☒ NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title: CIRCUIT CARD ASSEMBLY INTERFACE MODULE	Customer No. —	Librascope No. L535 300 615	Revision 2
Next Assembly: COMPUTER PROGRAMMER MODEL CP7 ☐ Multi-Use	Customer No. of N/A —	Libra. No. of N/A L200 024 705	Class Chg II
Serialized Item Nomenclature —	Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor JB
End Item Nomenclature — ☐ Multi-Use	Cust. No. of End Item —	Libra. No. of End Item —	10-7-77

Reason for Revision: TO COMPLETE ASSEMBLY DWG

Change Requested on Contract: N/A

Change Order ☐ Drawing Change ☒

Orig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
M. ALLISON 77-10-3	5 OCT 77	M. Allison 77-10-7		

Change Board: Chair. / Eng. / Q.C. / C.M. / Mfg. — Date

RFI No. — DCR No. —

ECP No. — D/W No. —

AFFECTED	YES	NO
Master Layout	X	
Eng. Spec. (ES)		X
Test Equipment		X
P.O. Change Req'd.		X
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval Concurrence of Class N/A ☐

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg. —

Serial Req. Backfit —

Serials in Compliance —

Mfg. Job No. Affected: A8-401

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT

WAS: "A" SIZE 4 SHEETS
INC EO REV 1

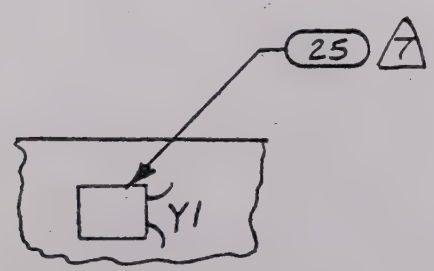
ADD TO PARTS LIST:

25	AR		L101 000 896	URETHANE BOND

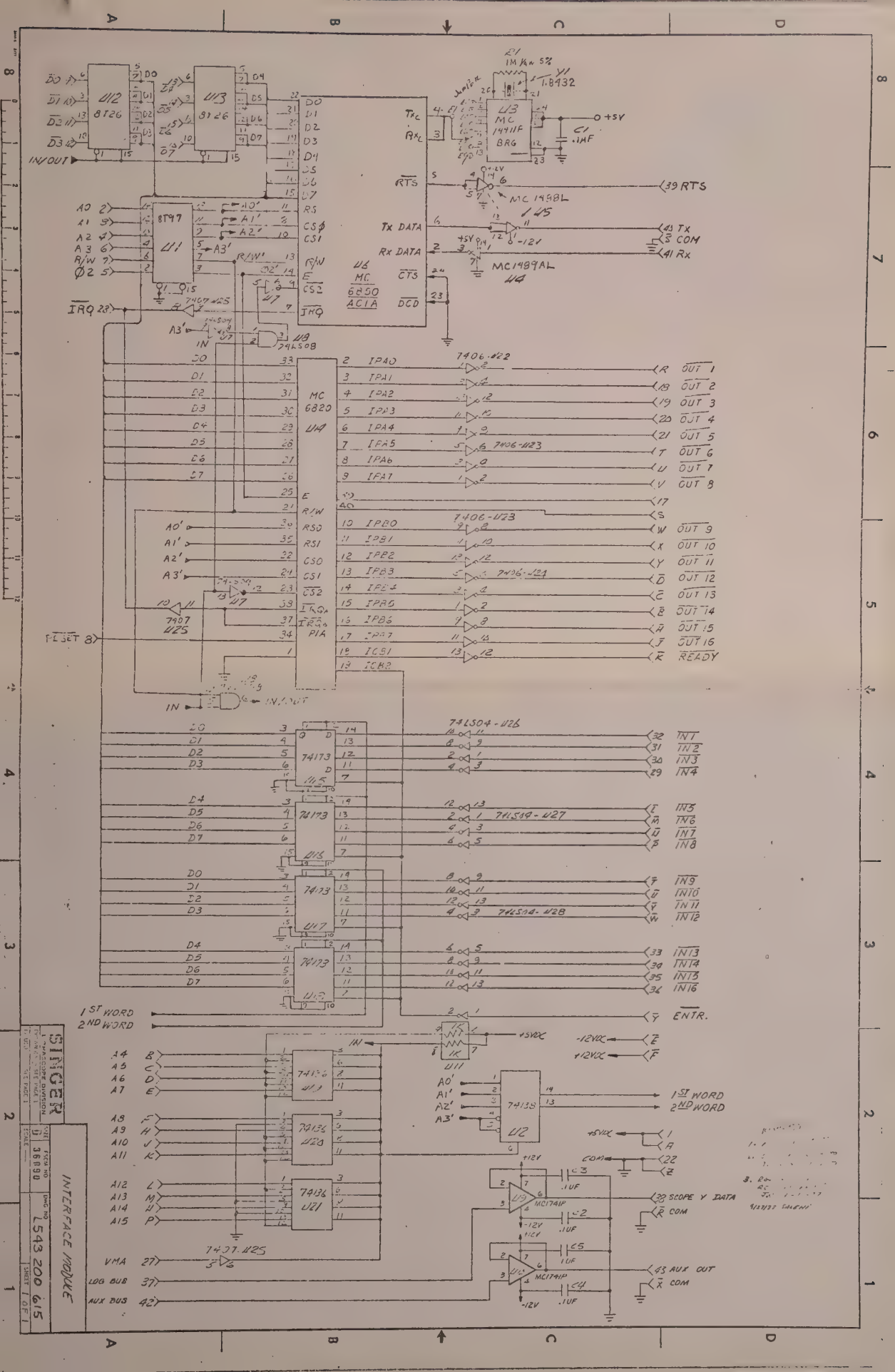
ADD TO NOTES:

△7 BOND FIND NO. 19 TO FIND NO. 1 USING FIND NO. 25.

ADD TO F/D, ZN 5/C:



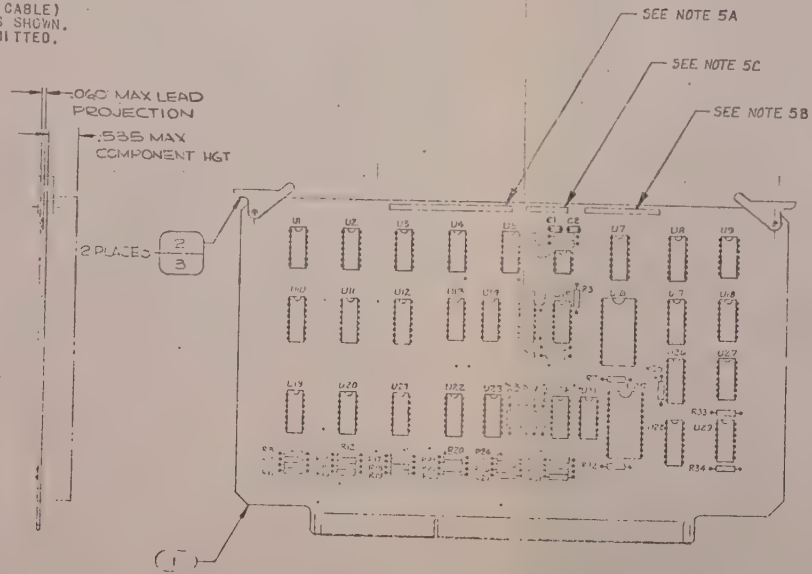
3125-7 9/75


U12 8T26
U13 8T26
U1 8T97
U7 7407 U25
U8 74LS08
U6 MC 6850 ACIA
U4 MC 1489AL
U5 MC 1488L
U3 MC 14411F BRG
Y1 1.8432
C1 .1MF
C2 .1UF
C3 .1UF
C4 .1UF
C5 .1UF
U9 MC1741P
U10 MC1741P
U11 1K
U14 74136 U19
U20 74136
U21 74136
U12 74138
U15 74173
U16 74173
U17 74173
U18 74173
7406-U22
7406-U23
7406-U24
74LS04-U26
74LS19-U27
74LS04-U28
7407 U25
IN/OUT
IRQ
RESET
1ST WORD
2ND WORD
ENTR.
+5VDC
-12VDC
+12VDC
COM
SCOPE Y DATA
AUX OUT
LOG BUS
AUX BUS
VMA
INTERFACE MODULE
SINGER
LS43 200 615
SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 3609C ASSY L535 300 G16
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

REVISIONS			
ZONE	REV	DESCRIPTION	DATE
	C	INC EO 1 & 2	



REFERENCE DESIGNATION	ITEM NO.
R26-R30	22
R8-R31	22
R7, R32-R35	21
R6	20
R5	19
R1-R4	18
C1, C2	17
U29, U30, U31	14
U26, U28	15
U25	12
U19-U24	10
U16	11
U15	9
U10, U11, U12	4
U9, U18, U27	16
U8	13
U7, U17	8
U6	7
U4, U5, U13, U14	6
U3	5
U1, U2	3

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 616

FIND NO.	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
23	5		L604 005 060	RESISTOR, 120Ω, ±5%, ¼W
22	24		L604 005 055	RESISTOR, 75KΩ, ±5%, ¼W
21	5		L604 005 082	RESISTOR, 1KΩ, ±5%, ¼W
20	1		L604 005 069	RESISTOR, 2KΩ, ±5%, ¼W
19	1		L604 005 098	RESISTOR, 4.7KΩ, ±5%, ¼W
18	4		L604 005 065	RESISTOR, 200Ω, ±5%, ¼W
17	2		L602 002 248	CAPACITOR, .1UF, +80%, 50V
16	3		L537 000 315	IC, QUAD 2-IN, EXCLUSIVE-OR GATE (74LS86)
15	2		L537 000 282	IC, HEX INVERTER, TRI-STATE (8T98)
14	3		L537 000 269	IC, HEX BUFFER/DRIVER (7407)
13	1		L537 000 281	IC, HEX INVERTER, TRI-STATE (8T97)
12	1		L537 000 311	IC, MOS CHARACTER GENERATOR (2501)
11	1		L537 000 312	IC, N MOS, MEMORY, RAM, STATIC (6810)
10	6		L537 000 310	IC, LINEAR DRIVER, QUAD (75491)
9	1		L537 000 306	IC, QUAD TRANSISTOR (2N2222)
8	2		L537 000 314	IC, COUNTER, UP/DOWN (74LS191)
7	1		L537 000 315	IC, LINEAR, TIMER (MC1455P)
6	4		L537 000 303	IC, 8-INPUT NAND GATE (74LS30)
5	3		L537 000 272	IC, 4 INPUT AND GATE (74S21)
4	3		L537 000 276	IC, DECODER/MULTIPLEXER (74LS138)
3	2		H593160 904	PIN, SPRING, SLOTTED
2	2		L200024675	EJECTOR, CIRCUIT CARD
1	1		L535200 616	PRINTED WIRING BOARD

PARTS LIST

NEXT ASSY	USED ON		
APPLICATION			

DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02 SURFACE
3 PLACE ± .010 TEXTURE
4 PLACE ± .0005
BREAK SHARP EDGES MAX
MATERIAL

DRAWN
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
DISPLAY DRIVER

SIZE 35000 DWG NO L535 300 616

GINEERING ORDER [X] NOTICE OF REVISION [ ]

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

awing Title: CIRCUIT CARD ASSEMBLY DISPLAY DRIVER	Customer No.: —	Librascope No.: L535 300616	Revision: 2
ext Assembly: COMPUTER PROGRAMMER MODEL CP7] Multi-Use	Customer No. of N/A: —	Libra. No. of N/A: L 200 024 705	Class Chg: —
erialized Item omenclature	Cust. No. of Ser. Item: —	Libra. No. of Ser. Item: —	Rel Coor: [illegible]
d Item Nomenclature: CP7] Multi-Use	Cust. No. of End Item: —	Libra. No. of End Item: —	10-6 77

eason for evision: TO COMPLETE ASSY DRAWING

Change Requested on Contract: J/P

Change Order

Drawing Change: X

Sig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
	C Harris 4 OCT 77	[illegible]	X	X

Change Board	Date
Chair.	
Eng.	
Q.C.	
C.M.	
Mfg.	

RFI No. | DCR No.

ECP No. | D/W No.

AFFECTED	YES	NO
ister Layout		X
g. Spec. (ES)		X
est Equipment		X
.O. Change Req'd.		X
Assembly PL Revision Control		
eparate PL @ Rev.		
rawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is	X	X	X	X
Rework				
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval: [illegible]

Concurrence of Class [ ]

Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM

Effective Serial in Mfg.

Serial Req. Backfit

Serials in Compliance

Mfg. Job No. Affected

ESCRIPTION OF CHANGE

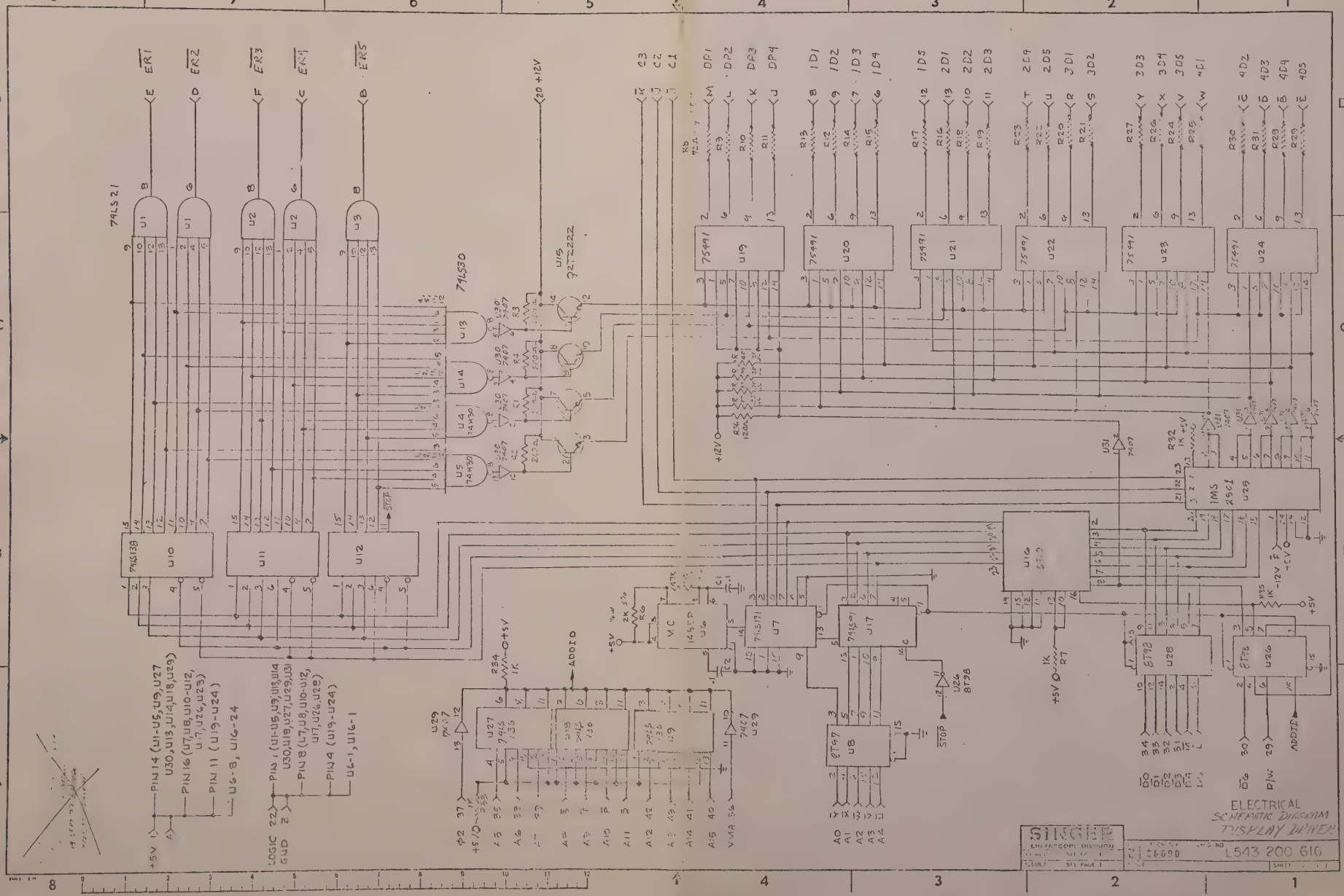
REVISED & REDRAWN ON NEW FORMAT
WAS: "A" SIZE, 4 SHEETS (FIND NO.'S CHANGED)

FIND NO. 13; IS: 1 QTY
S/B: 3 QTY

FIND NO. 22; IS: 7 QTY
S/B: 5 QTY

ADD 4 QTY, L604 005 065, RESISTOR, 200 Ω, ±5%, 1/4W

ADD 5 QTY, L604 005 060, RESISTOR, 120 Ω, ±5%, 1/4W

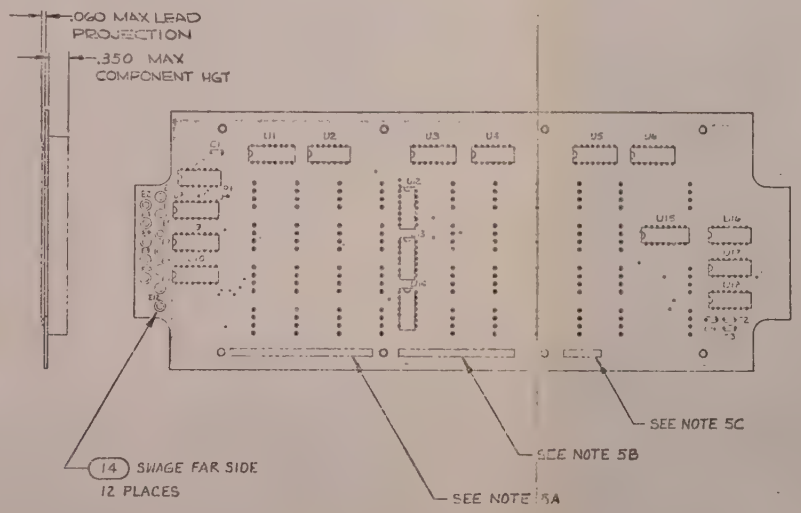

ELECTRICAL
SCHEMATIC DIAGRAM
DISPLAY DRIVER
SINGER
L543 200 616
26090

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
   A. 36090 ASSY L535 200 618
   B. SERIAL NO. (AS ASSIGNED)
   C. LATEST REVISION (AS APPLICABLE)
   D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	3	INC EO 1, 2-3		



FIND NO	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
14	12		H348 335 012	TERMINAL, STUD
13	1		L604 005 082	RESISTOR, 1KΩ, ±5%, ¼W
12	3		L609 002 317	CAPACITOR, 270 PF, ±10%, 200V
11	1		L609 002 348	CAPACITOR, .1MF, ±10%, 50V
10	3		L566 000 081	RESISTOR NETWORK, 10KΩ
9	2		L537 000 319	IC, DUAL 4-INPUT POS AND GATE (7421)
8	5		L537 000 309	IC, ENCODER, OCTAL, 8-TO-3 LINE (74LS148)
7	1		L537 000 302	IC, 8-INPUT, NAND GATE (74LS30)
6	1		L537 000 272	IC, DUAL, 4-INPUT, AND GATE (74LS21)
5	1		L537 000 282	IC, HEX INVERTER TRI-STATE (8T98)
4	1		L537 000 270	IC, QUAD 2-INPUT, AND GATE (74LS08)
3	1		L537 000 288	IC, HEX INVERTER, BUFFER/DRIVER (7406)
2	2		L537 000 298	IC, REGISTER, 4-BIT, D-TYPE (74LS173)
1	1		L535 200 618	PRINTED WIRING BOARD

PARTS LIST

REFERENCE DESIGNATION	ITEM NO.
E1-E12	14
R1	13
C2, C3, C4	12
C1	11
U18	4
U17	7
U13, U14	9
U12	6
U10	5
U8, U9	2
U7	3
U2, U4, U16	10
U1, U3, U5, U6, U15	8

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 618

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR ±
2 PLACE ± .02 SURFACE
3 PLACE ± .010 TEXTURE
4 PLACE ± .0005
BREAK SHARP EDGES MAX
MATERIAL

DWN
CHKD
APVD
CONTRACT NO

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
KEYBOARD

SIZE D | FSCM NO 36090 | DWG NO L535 300 618
SCALE 1/1 | SHEET 1 OF 1

NEXT ASSY | USED ON
APPLICATION

GINEERING ORDER ☒ NOTICE OF REVISION ☐ SINGER LIBRASCOPE DIVISION CODE IDENT 36090 NOR NO. _____ SHEET 1 OF 1

awing .tle	CIRCUIT CARD ASSY KEYBOARD	Customer No. —	Librascope No. L535 300 618	Revision 3
ıxt Assembly] Multi-Use	COMPUTER PROGRAMMER MODEL CP7	Customer No. of N/A —	Libra. No. of N/A L200 024 705	Class Chg II
ırialized Item omenclature		Cust. No. of Ser. Item —	Libra. No. of Ser. Item —	Rel Coor (W)
ıd Item Nomenclature] Multi-Use	CP7	Cust. No. of End Item	Libra. No. of End Item	
eason for evision	TO COMPLETE ASSY DRAWING	Change Requested on Contract N/A	Change Order / Drawing Change ✕	

rig. Date	Drawn Date	Checked Date	Proj. Eng. Date	Proj. Mgr. Date
—	C Harris 7 OCT 77	M. Allin 77-10-11	*	*

Change Board	Date
Chair.	
Eng.	
Q.C.	
C.M.	
Mfg.	

RFI No.	DCR No.
ECP No.	D/W No.

AFFECTED	YES	NO
Master Layout		✕
Eng. Spec. (ES)		✕
Test Equipment		✕
P.O. Change Req'd.	✕	
Assembly PL Revision Control		
Separate PL @ Rev.		
Drawing @ Rev.		

DISPOSITION OF ITEM	In Process	In Stock	N/A In Process	N/A Compl.
Use As Is		✕	✕	✕
Rework	✕			
Scrap (MRB Req'd.)				
Parts Conform				
Reinspect				
Repair (MRB Req'd)				

Customer Approval N/A	
Concurrence of Class	☐
Immediate Compliance	
Optimum Cost	
End Item Not Affected	
Record Change Only	

SERIALIZED ITEM
Effective Serial in Mfg.
Serial Req. Backfit
Serials in Compliance
Mfg. Job No. Affected AE-401

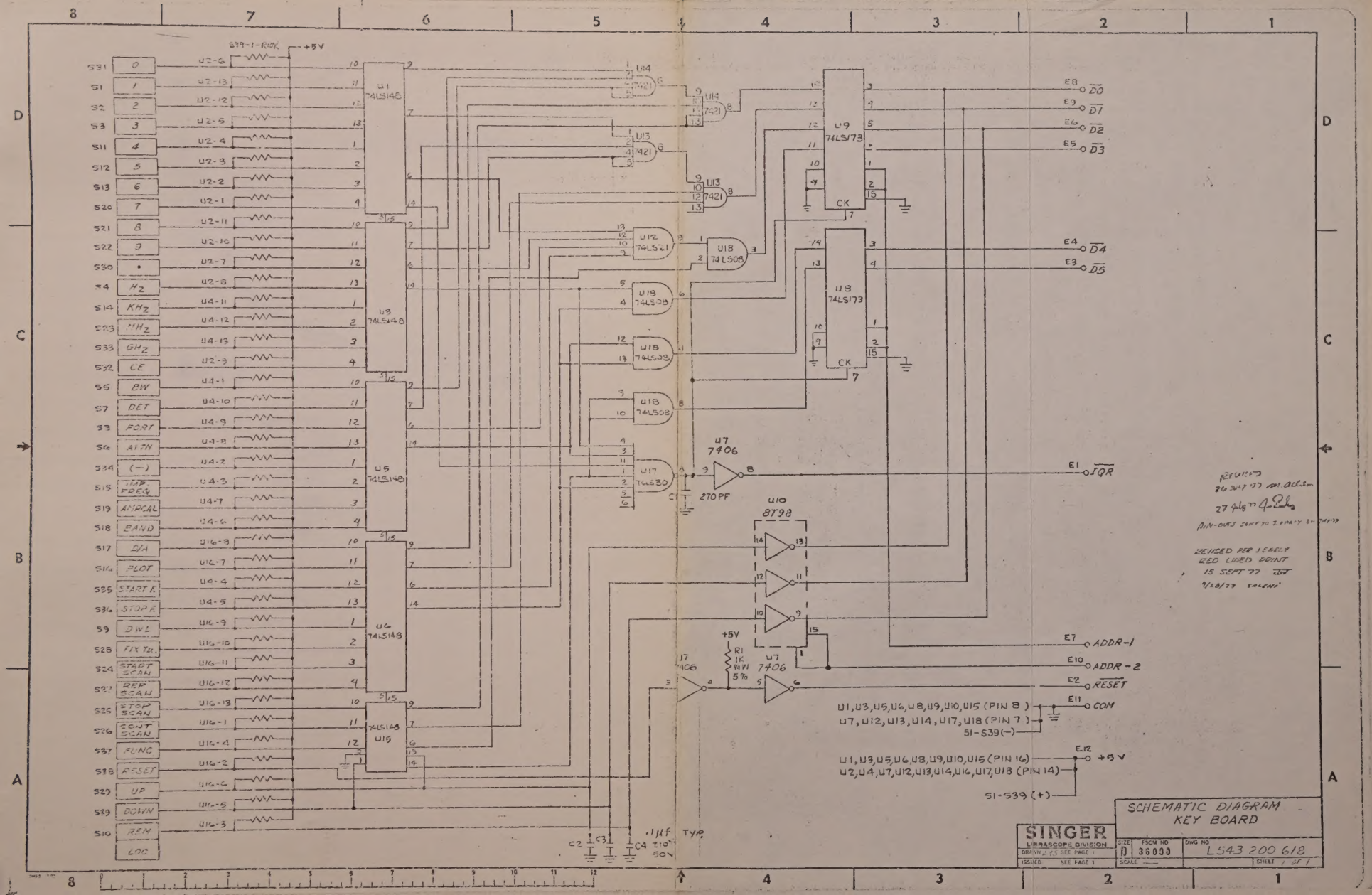
DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT
WAS: "A" SIZE 4 SHEETS

ADD TO P/L:

9	2		L537 000 319	IC, DUAL 4-INPUT, POS AND GATE (7421)
11	1		L609 002 348	CAPACITOR, 1MF, ±10%, 50V
12	3		L609 002 317	CAPACITOR, 270 PF, ±10%, 200V
13	1		L604 005 082	CAPACITOR, 1K Ω, ±5%, 1/4W

3125-7 9/75



SINGER
LIBRASCOPE DIVISION
DRAWN J.F.S. SEE PAGE 1
ISSUED SEE PAGE 1

SCHEMATIC DIAGRAM
KEY BOARD

SIZE	FSCM NO	DWG NO
D	36000	L543 200 618
SCALE —		SHEET 1 OF 1

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